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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

RICOH COMPANY, LTD., Plaintiff, vs. AEROFLEX INCORPORATED, et al., Defendants.	Case No. C03-04669 MJJ (EMC) Case No. C03-2289 MJJ (EMC) **RESPONSIVE CLAIM CONSTRUCTION BRIEF FOR U. S. PATENT NO. 4,922,432 (RE-FILED)**
SYNOPSYS, INC., Plaintiff, vs. RICOH COMPANY, LTD., a Japanese corporation Defendant.	Date: October 29, 2004 Time: 9:30 AM Courtroom: 11 Judge: Martin J. Jenkins

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I. INTRODUCTION

Long-standing precedent from the Court of Appeals for the Federal Circuit prohibits patent owners, like Ricoh, from proffering interpretations for the purposes of litigation that would alter the indisputable public record and treat the claims as a "nose of wax." This is precisely what Ricoh seeks to accomplish here. Ricoh proffers interpretations for the disputed claim terms that contradict the clear import of the '432 patent, its file history, and the prior art that was distinguished from the invention in that file history.

For example, the public record for the '432 patent clearly and unmistakably limits the claimed invention by requiring that: (1) the input specifications be in a simple flowchart format; (2) the input specifications exclude what are known as register-transfer level descriptions; and (3) a rule-based expert system software be used as opposed to conventional software programs to select the hardware cells for the design of the desired ASIC. Because Ricoh knows that the use of the Synopsys Design Compiler® products at issue in the captioned actions are not capable of meeting any of these three requirements, Ricoh proposes constructions for the disputed claim terms that are contrary to the '432 patent's public record.

In fact, litigation induced interpretations that run contrary to the understanding of a person of ordinary skill in the art pervade Ricoh's entire opening claim construction brief. For this reason, the court should adopt Synopsys' and Defendants' proposed constructions, which are consistent with how a person of skill in the art would understand the '432 patent's claims, specification, and its file history.

II. LEGAL PRINCIPLES GOVERNING CLAIM CONSTRUCTION

The proper construction of disputed terms in a patent claim—*i.e.*, claim construction—is an issue of law reserved exclusively for the Court. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996). Claim construction is the judicial determination of what is and what is not covered by the disputed terms in the patent claims. *Network, LLC v. Centraal Corp.*, 242 F.3d 1347, 1352 (Fed. Cir. 2001) (citing *United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997)). Claim construction issues are legal issues for the Court to decide, and therefore, neither party bears the burden of proof on those legal issues.

Recently, the Court of Appeals for the Federal Circuit, in *Phillips v. AWH Corp.*, 376 F.3d 1382 (Fed. Cir. 2004) issued an order granting a petition to rehear that appeal, *en banc*, to address and resolve issues concerning claim construction. Specifically, that order demonstrates that the Federal Circuit will be addressing, *en banc*, issues regarding claim construction methodologies and the appropriate role and use of intrinsic evidence and extrinsic evidence such as expert testimony and technical dictionaries to interpret disputed claim terms. *Id*. at 1383-84. Despite the existing uncertainty in the Federal Circuit's decisions regarding the appropriate "methodology" for interpreting disputed claim terms, as recognized by the Federal Circuit's order in *Philips*, Synopsys and Defendants believe that the following five basic long-standing legal principles, explained below, should guide this court's construction of the disputed claim terms in the present action.

A. Disputed Claim Terms Are Generally Given Their Ordinary Meaning To One Of Ordinary Skill In The Art

When construing disputed claim terms, "the court must apply the same understanding as that of persons knowledgeable in the field of the invention." *Merck & Co v. Teva Pharms. USA, Inc.*, 347 F.3d 1367, 1371 (Fed. Cir. 2003) "'[P]atents are written not for laymen, but for and by persons experienced in the field of the invention.'" 347 F.3d at 1371 (citation omitted); *See also, Multiform Desiccants, Inc., v. Medzam, Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998). "Accordingly, a technical term used in a patent is interpreted as having the meaning a person of ordinary skill in the field of the invention would understand it to mean." *Bell Atl. Network Servs. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). Generally, the court gives the disputed "claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art." *Id.*[1]

"The ordinary and customary meaning of a claim term to one of ordinary skill in the art may

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[1] Some decisions from the Federal Circuit refer to a "presumption" of ordinary meaning for disputed claim terms—an issue of law. But Rule 301 of the Fed. R. Evid. provides that presumptions in civil actions "vanish[] upon the introduction of evidence sufficient to support a finding of the nonexistence of the presumed **fact**." *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1037 (Fed. Cir. 1992) (en banc) (emphasis added). Given that presumptions relate to "factual" and not "legal" issues, these cases merely stand for the proposition that claim terms should generally be given their ordinary meaning to a person of skill in the art unless the intrinsic evidence clearly supports (explicitly or implicitly) a different meaning.

be ascertained from a variety of sources . . .” *W.E. Hall Co. v. Atlanta Corrugating*, LLC, 370 F.3d 1343, 1350 (Fed. Cir. 2004). Such sources include: 1) the intrinsic evidence, *i.e.*, the patent’s claims, specification, and its file history, including any prior art cited in the patent or file history; and, 2) extrinsic evidence, such as expert testimony, technical dictionaries, treatises, and textbooks, and prior art not cited in the patent or its file history. *See id*; *Merck & Co.*, 347 F.3d at 1372; *Kumar v. Ovonic Battery Co.*, 351 F.3d 1364, 1368 (Fed. Cir. 2003). While extrinsic evidence may be useful to shed light on the relevant art and therefore assist the court in placing itself in the shoes of one of ordinary skill in the art, it is the intrinsic evidence that constitutes the public record of the patentee’s claim, a record on which reasonable competitors are entitled to rely. *See Vanderlande Indus. Nederland BV v. ITC*, 366 F.3d 1311, 1318 (Fed. Cir. 2004) (citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

B. Intrinsic Evidence Is The Most Significant Source For Determining The Ordinary Meaning Of Disputed Claims Terms

“‘It is well-settled that, in interpreting an asserted claim, the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history . . . Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language.’” *Bell Atl. Network Servs.*, 262 F.3d at 1267 (quoting, *Vitronics Corp.*, 90 F.3d at 1582).

First, the claim construction analysis always begins with the words of the claims, which are examined through the viewing glass of a person of skill in the art. *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331-32 (Fed. Cir. 2001); *See Vitronics*, 90 F.3d at 1582. While the focus may be on the particular claim terms or phrases in dispute, the “context of the surrounding words in a claim also must be considered in determining the ordinary and customary meaning of a disputed claim limitation.” *Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 345 F.3d 1318, 1325 (Fed. Cir. 2003). In fact, the words in both the asserted and nonasserted claims must be considered in defining the scope of the claimed invention. *Vitronics*, 90 F.3d at 1582. Most importantly, in construing the disputed claim terms, “the analytical focus must begin and remain centered on the

language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.'" *Interactive Gift Express*, 256 F.3d at 1331 (quoting 35 U.S.C. § 112, ¶ 2).

Second, "'[c]laims are not interpreted in a vacuum, but are part of and are read in light of the specification.'" *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1347 (Fed. Cir. 2004) (citation omitted). "A fundamental rule of claim construction is that terms in a patent document are construed with the meaning with which they are presented in the patent document." *Merck & Co.*, 347 F.3d at 1371 ("[C]laims must be construed so as to be consistent with the specification, of which they are a part."). "Thus, the specification is always highly relevant to the claim construction analysis." *Vitronics*, 90 F.3d at 1582. "Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* In short, the patent's description in the specification is always relevant to determining the ordinary and customary meaning of the disputed claim terms and therefore, must be examined for that purpose in every case.

Third, although "[t]he best source for understanding a technical term is the specification from which it arose," that understanding should be "informed, as needed, by the prosecution history." *Multiform Desiccants*, 133 F.3d at 1478. The prosecution history "reveals how those closest to the patenting process – the inventor and the patent examiner – viewed the subject matter." *Id.* Thus, the patent's file history is certainly a significant source for ascertaining the ordinary meaning of claim terms that must be reviewed in every case. *Jansen v. Rexall Sundown, Inc.*, 342 F.3d 1329, 1333 (Fed. Cir. 2003).

Besides the patent's claims, specification and its file history, the prior art cited in the patent and its file history also constitutes intrinsic evidence that provides valuable guidance that may be dispositive on the ordinary meaning of a claim term to one of skill in the art. *Kumar*, 351 F.3d at 1368. "'[W]hen prior art that sheds light on the meaning of a term is cited by the patentee, it can have particular value as a guide to the proper construction of the term, because it may indicate not only the meaning of the term to persons skilled in the art, but also that the patentee intended to adopt that meaning.'" *Kumar*, 351 F.3d at 1368 (quoting *Arthur A. Collins, Inc. v. N. Telecom, Ltd.*, 216 F.3d 1042, 1045 (Fed. Cir. 2000)). Thus, like the patent's claims, specification, and its file history,

the prior art cited in the patent or its file history is part of the intrinsic evidence and therefore, must also be examined for determining the ordinary meaning of claim terms in every case. *See Kumar,* 351 F. 3d 1368.

C. Extrinsic Evidence May Be Relied On To Ascertain The Ordinary Meaning Of Disputed Claims Terms

Extrinsic evidence may be examined by the court to help understand the disputed claim term, shed light on the relevant field of the invention, and ensure that the court's construction of the disputed claim terms are consistent with the "'clearly expressed, plainly apposite, and widely held understandings in the pertinent technical field." *AFG Indus., Inc. v. Cardinal IG Co., Ltd.*, 239 F.3d 1239, 1249 (Fed. Cir. 2001) (citations omitted); *See also, Vitronics*, 90 F.3d at 1584 ("extrinsic evidence…may be used only to help the court come to the proper understanding of the claims . . ."). Thus, extrinsic evidence may be used to assist the court in ascertaining the ordinary meaning of the disputed claim terms. *Bell Atl. Network*, 262 F.3d at 1268-69.

1. Prior Art, Technical Dictionaries And Treatises Are The Preferred Sources Of Extrinsic Evidence

Because prior art and technical dictionaries "are more objective and reliable guides" and such "sources are accessible to the public in advance of litigation", they are the extrinsic evidence sources that are preferred over expert opinion testimony. *Vitronics,* 90 F.3d at 1585. Specifically, "prior art can often help to demonstrate how a disputed term is used by those skilled in the art" and "may also be more indicative of what all those skilled in the art generally believe a certain term means." *Id*. at 1584. Similarly, the court may use technical dictionaries and treatises "to better understand the technology" and "when construing claim terms," as long as those definitions do not "contradict any definition found in or ascertained by a reading of the" intrinsic evidence. *Id*. at 1584 n.6. Thus, the court may certainly rely on both prior art not cited in the intrinsic evidence and technical dictionaries to ascertain the ordinary meaning of disputed claim terms. *Id*. at 1584-85.

2. Non-Scientific Or General-Usage Dictionaries Are Irrelevant To The Meaning Of Terms Of Art And Ordinary Words Used In A Technological Context

Unlike appropriate technical dictionaries and treatises reflecting the understandings of persons of skill in the field of the invention, however, except for limited circumstances, non-scientific or general-usage dictionaries are irrelevant to the meaning of both ordinary words "in a technological context" and technical terms of art in the field of the invention. *AFG Indus.*, 239 F.3d at 1248. "Only when the context is unclear, or it appears that the term is not being used in a technical manner, should the trial court rely upon a general purpose dictionary for construing the term." *Id.* "But where evidence – such as expert testimony…or technical dictionaries – demonstrates that artisans would attach a special meaning to a claim term, or…would attach no meaning at all to that claim term (independent of the specification), general-usage dictionaries are rendered irrelevant with respect to that term; a general-usage dictionary cannot overcome credible art-specific evidence of the meaning or lack of meaning of a claim term." *Vanderlande*, 366 F.3d at 1321. For these reasons, the Federal Circuit has repeatedly "'cautioned against the use of non-scientific dictionaries, 'lest dictionary definitions . . . be converted into technical terms of art having legal, not linguistic significance.'" *See e.g., id.* (citations omitted).

3. Expert Testimony Should Be Used To Inform The Court's Construction And A Failure To Take Into Account Such Testimony May Constitute Reversible Error

Although prior art (not cited in the intrinsic evidence) and technical dictionaries and treatises are the preferred sources of extrinsic evidence, expert testimony may also be used "to help the court come to the proper understanding of the claims." *Vitronics*, 90 F.3d at 1584. In fact, because a term of art must be construed in a manner consistent with the scientific and technical context in which it is used in the patent, in some instances "'the testimony of scientific witnesses is indispensable to a correct understanding' of the meaning of disputed claim terms, and . . .'it would undoubtedly be error for the court to reject the testimony.'" *AFG Indus., Inc.*, 239 F.3d at 1249 (quoting *Seymour v. Osbourne*, 78 U.S. 516, 546 (1871)). Expert testimony "can and should be used to inform the court's" construction of disputed claim terms and a "failure to take into account the testimony of

persons of ordinary skill in the art may constitute reversible error." *Id.* In short, where the claims contain technical terms or terms of art it is not only appropriate but preferable that the court consult trustworthy expert testimony to aid the court in coming to the correct conclusion on the proper meaning of disputed terms of art in the claims. *See id*.

D. Only Intrinsic Evidence May Be Used To Establish A Meaning For A Disputed Claim Term Other Than Its Ordinary Meaning To One Of Skill In The Art

Generally, the court gives the disputed "claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art." *Bell Atl. Network*, 262 F.3d at 1267; *Vitronics*, 90 F.3d at 1582. The circumstances where a claim term may be construed to have a meaning other than its ordinary meaning to one of skill in the field of the invention include where the intrinsic evidence: 1) plainly defines the claim term either explicitly or by implication; 2) shows that the patentee distinguished the invention from a prior art reference, expressly disclaims subject matter from the scope of the invention, or highlights a particular feature as important to the invention; 3) provides meaning to a claim term that would otherwise render the scope of the claim unclear. *See e.g., W.E. Hall Co.*, 370 F.3d at 1353. The circumstances where a court's construction may depart from the ordinary meaning of a disputed claim term are best understood through examples of actual decisions.

1. The Intrinsic Evidence May Implicitly Define A Claim Term With Or Without An Explicit Statement Of Redefinition

First, a claim term may be redefined by the intrinsic evidence with or without an explicit statement of redefinition. *Bell Atl. Network*, 262 F.3d at 1268; *see, Vitronics*, 90 F.3d at 1584 n.6 (meaning of claim terms may be "'found in or ascertained by a reading of the patent documents'"). In *Bell Atl. Network*, the Federal Circuit affirmed the district court's grant of summary judgment of non-infringement. 262 F.3d at 1262. The Federal Circuit agreed with the district court's construction of the claim term "mode" because it was implicitly defined in the intrinsic evidence to be limited to the three broad categories described in the patent's specification. *Id*. at 1273. The Federal Circuit came to this conclusion in spite of the broad ordinary meaning of the non-technical term "mode." *Id*. at 1270. The reasoning behind the Federal Circuit's conclusion is that "a claim term may be clearly redefined without an explicit [definition]" and that "when a patentee uses a claim term throughout the

entire patent specification, in a manner consistent with only a single meaning, he has defined that term 'by implication.'" *Id*. at 1271 (citing *Vitronics*, 90 F.3d at 1582).

The Court also agreed with the district court's conclusion that even claims not explicitly reciting the "mode" limitation were also limited to the three broad categories described in the patent's specification. 262 F.3d at 1275. This conclusion was based on the Court's recognition that "one of ordinary skill in the art would understand that the transceiver" described in the claim not including the "mode" limitation was the same as the one that included the "mode" limitation and was therefore limited by the implicit definition of the term "mode" in the intrinsic evidence. *Id.*

2. The Patent's File History Limits The Invention By Excluding What Was Disclaimed

Second, the "doctrine of prosecution disclaimer is well established in Supreme Court precedent" and that doctrine has been adhered to by the Court of Appeals for the Federal Circuit "as a fundamental precept" in its "claim construction jurisprudence." *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). Prosecution disclaimer refers to the Federal Circuit precedent that "the prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *See e.g., Southwall Techs., Inc v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995) ("sputter-deposited dielectric" limited to one-step process by patentee's argument that dielectric was "directly deposited.").

"As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution." *Omega Eng'g*, 334 F. 3d at 1324. "[F]or prosecution disclaimer to attach [Federal Circuit] precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable." *Id.* at 1325-6. In determining whether prosecution disclaimer limits the scope of the claimed invention, a court must assess "whether a patentee relinquished a particular claim construction based on the totality of the prosecution history, which includes amendments to claims and arguments made to overcome or distinguish references." *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319, 1326 (Fed. Cir. 2002); *See also, Biogen, Inc. v. Berlex Labs, Inc.*,

318 F.3d 1132, 1139 (Fed. Cir. 2003) (district court correctly found that based on examiner's statements "single DNA construct" limitation was basis on which all claims were allowed by examiner and properly declined to interpret "method claims as free of this limitation").

In *Biogen*, the Federal Circuit affirmed the district court's granting of the defendant's motion for summary judgment of non-infringement. 318 F.3d at 1142. The principle issue on appeal was whether the district court's interpretation properly limited the method claims to the use of a "single DNA construct" even though those method claims were not amended and did not mention the use of a "single DNA construct." *Id*. at 1134. The Federal Circuit agreed with the district court's conclusion that the examiner's statements after a telephonic interview with the applicant in the examiner's Reason for Allowance, read objectively, establishes that the "single DNA construct" was the examiner's only basis for allowing all of the claims. *Id*. at 1139. Thus, even the method claims that were not amended to include such a limitation were properly limited to the use of a "single DNA construct." *See e.g., ACCO Brands, Inc. v. Micro Sec. Devices, Inc.*, 346 F.3d 1075, 1079 (Fed. Cir. 2003) ("'[I]t is incorrect to construe a claim as encompassing the scope that was relinquished in order to obtain allowance of another claim, despite a difference in words used.'") (quoting *Modine Mfg. Co. v. United States Int'l Trade Comm'n*, 75 F.3d 1545, 1551 (Fed. Cir. 1996) (emphasis added) abrogated on other grounds by *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 234 F.3d 558 (Fed. Cir. 2000); *See also, Springs Window Fashions LP v. Novo Indus., L.P.*, 323 F.3d 989, at 995-6 (Fed. Cir. 2003) (distinguishing prior art patent limited claim scope to distinguishing features despite fact those features were not and are not reflected in claims).

Similarly, in the Federal Circuit's *ACCO Brands* decision, which also affirmed the granting of summary judgment of non-infringement by the district court, the Court concluded that the "pin clause" of unamended "claim 10 must be construed in the same way" as the amended "pin clause of claim 1." *ACCO Brands*, 346 F.3d at 1079. The Court came to this conclusion based on the statements in the examiner's Reasons for Allowance. *Id.* Those statements repeated the arguments presented by the applicant and demonstrated "that the examiner and the applicant understood that the invention requires that the pin extends (actively) into the slot after rotation." *Id.* The Court reasoned that although the pin clause of claim 10 was not amended and therefore, used different words for the

pin clause than the words used in amended claim 1, claim 10 could not be construed to encompass the subject matter that was relinquished to obtain claim 1. *Id.*

3. **The Patent's Specification May Also Limit The Scope Of The Invention**

"Whether an invention is fairly claimed more broadly than the 'preferred embodiment' in the specification is a question specific to the content of the specification, the context in which the embodiment is described, the prosecution history, and if appropriate the prior art, for claims should be construed, when feasible, to sustain their validity." *Wang Labs., Inc. v. Am. Online, Inc.*, 197 F.3d 1377, 1383 (Fed. Cir. 1999). "The usage 'preferred' does not of itself broaden the claims beyond their support in the specification." *Id*; *Bell Atl. Network*, 262 F.3d at 1273; *See also, Biogen*, 318 F.3d at 1140 (Claims do not "'enlarge what is patented beyond what the inventor has described as [his] invention.'") (quoting *Network*, 242 F.3d at 1352).

In *Biogen*, the Court agreed with the district court's conclusion "that the specification defines the invention as the use of a single DNA construct . . . and that the method and cell line claims, as well as the construct claims, are so limited." 318 F. 3d at 1140. The Court recognized that although the specification mentioned other known general techniques, the "specification does not describe or present details of any other configuration for introducing these genes" but instead "describes only linked DNA sequences and transformation procedures using single constructs . . . " *Id.* at 1136-37. The Court noted that the claims may not "'enlarge what is patented beyond what the inventor has described as [his] invention.'" *Id.* at 1140 (quoting *Network*, 242 F. 3d at 1352). The Court concluded that the district court's interpretation properly limited the method claims to the use of a "single DNA construct" even though those methods claims were not amended and did not mention the use of a "single DNA construct."

Similarly, in *Wang Labs*, the Federal Circuit agreed with the district court's conclusion that although the general usage of the term "frame" encompassed both bit-mapped display systems and character-based systems, the description in the patent of character-based systems limited the claimed invention to character-based systems. 197 F.3d at 1381. In that case, the Federal Circuit affirmed the district court's grant of summary judgment to the defendants on the issue of infringement. 197 F.3d 1379. The only issue on appeal was whether the district court properly limited the interpretation of

the term "frame" to the "character-based protocols" described in the patent's specification. *Id.* at 1380.

The Court concluded that the only embodiment described in the patent's specification "is the character-based protocol, and the claims were correctly interpreted as limited thereto." *Id.* at 1383. In reaching this conclusion, the Court recognized that "in order to be covered by the claims…subject matter must be sufficiently described as the applicant's invention to meet the requirements of [35 U.S.C.] section 112. This requirement was not met as to protocols other than character-based." *Id.* In other words, neither the mere mention of other protocols nor the usage of "preferred" in the patent changed the fact that the patent's description only supported character-based protocols. *Id.* at 1382.

Not only is the scope of the invention properly limited to what is supported by the patent's description, but the teachings in the patent's description "'about the problems solved by the claimed invention, the way the claimed invention solves those problems' and the prior art that relates to the invention'" all "'provide valuable context for the meaning of the claim language.'" *ResQNet.com, Inc. v. Lansa, Inc.*, 346 F.3d 1374, 1381 (Fed. Cir. 2003) (citations omitted). In fact, the patent's specification may certainly limit the claimed invention to important features that are essential for solving the problems in the prior art solved by the claimed invention. *See Gaus v. Conair Corp.*, 363 F.3d 1284, 1289-90 (Fed. Cir. 2004).

In *Gaus*, the Federal Circuit reversed the jury's verdict of infringement under the doctrine of equivalents and entered judgment of non-infringement for the defendant. *Id.* at 1285. The principle issue was whether the "double conductor" was required to be structurally separate from the "voltage-carrying electrical operating unit." *Id.* at 1289. The Court concluded that this "structural separation" was required because the specification demonstrated that this "separation" is how one of the principle advantages of the invention over the prior art was achieved. *Id.* at 1289-90. The Court specifically noted that even if the claim language did not support the adopted construction, the specification's description that the "structural separation" was necessary for achieving the inventions advantages over the prior art presents "'a clear case of disclaimer of subject matter.'" *Id.* at 1288 n.2 (citation omitted).

E. Extrinsic Evidence May Never Be Used To Alter A Claim Term's Ordinary Meaning Or Any Other Meaning Established In The Intrinsic Evidence

Extrinsic evidence may never be used to vary, contradict, expand, or limit any meaning found in or ascertained from the intrinsic evidence. *See e.g.*, *Omega Eng'g*, 334 F.3d at 1332 (citing *Vitronics*, 90 F.3d at 1584-85). In fact, "[i]f the meaning of the claim limitation is apparent from the intrinsic evidence, it is improper to rely on extrinsic evidence other than that used to ascertain the ordinary meaning of the claim limitation." *Id.* (citing *Vitronics*, 90 F.3d at 1582). This prevents a patentee from "proffer[ing] an interpretation for the purposes of litigation that would alter the indisputable public record . . . and treat the claims as a 'nose of wax.'" *Vitronics*, 90 F.3d at 1583 (quoting *Southwall*, 54 F.3d at 1578).

III. SUMMARY OF THE '432 PATENT

A. The Goal Of The '432 Patent's Alleged Invention Is To Enable Non-Experts To Design ASICs

The '432 patent explains that the "invention provides a computer-aided design system and method for designing an application specific integrated circuit . . . " (Ex. 1 at Abstract). "An application specific integrated circuit (ASIC) is an integrated circuit chip designed to perform a specific function, as distinguished from standard, general purpose integrated circuit chips, such as microprocessors, memory chips, etc." (*Id*. at 1:13-17). Unlike general-purpose integrated circuit chips such as microprocessors, which are designed so that they may execute software for performing many different applications, an ASIC is designed for a specific function, for example, to control the operation of a vending machine. (*Id.* at 12:39-44).

According to the '432 patent, the ASIC design processes of the prior art require the designer to consider the required objectives and tasks for the desired ASIC and define the structural level design specification for that ASIC. (Ex. 1 at 1:19-23). This structural level design specification (or netlist) must define the various hardware components and their required interconnections as well as a system controller for synchronizing the operations of those hardware components. (*Id*. at 1:23-27). Because defining structural level design specifications requires the ASIC designer to have an "extensive and all encompassing knowledge" of these hardware components and their required

interconnections, the '432 patent concludes that the ASIC design process requires engineers with highly specialized skills and expertise in VLSI design. (*Id.* at 1:28-32, 1:58-65).

The stated goal of the '432 patent's claimed invention is to enable non-expert designers (*i.e.*, designers not having highly specialized skills and expertise in VLSI design) to design ASICs. (Ex. 1 at 2:14-19). The '432 patent's invention purports to accomplish this goal with computer-aided design software that: 1) allows non-expert designers to work with "simple flowcharts" that they are able to understand and which only requires them to know what the necessary logical steps are to complete a task and, 2) provides and applies the essential VLSI design expertise needed to design ASICs through the use of a rule-based expert system "extracted from expert ASIC designers." (Ex. 1 at 2:24-27, 2:57-63; 4:5-34, *see also* Abstract)(emphasis added):

> The flowchart is a highly effective means of **describing a sequence of logical operations**, and is well understood by software and hardware designers of **varying levels of expertise** and training.
>
> * * *
>
> The KBSC utilizes a **knowledge based expert system**, with a knowledge base **extracted from expert ASIC designers** with a high level of expertise in VLSI design to **generate from the flowchart a netlist** . . .
>
> * * *
>
> [T]he **design of an integrated circuit** at the structural level **requires** a design engineer with **highly specialized skills and expertise in VLSI design**. In the KBSC system of the present invention, however, integrated circuits can be designed at a functional level **because the expertise in VLSI design is provided and applied by the invention**. Allowing the designer to work with flowcharts…simplifies the task of designing custom integrated circuits . . . The designer deals with an algorithm using **simple flowcharts**…and needs to know only the **necessary logical steps** to complete a task . . .
>
> * * *

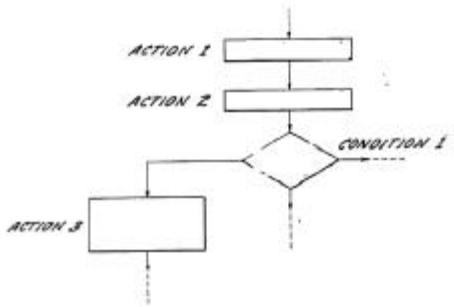
Thus, the "simple flowchart input" and the "rule-based expert system for generating a netlist from a flowchart" features are essential to achieving the '432 patent's stated goal. In fact, the '432 patent's inventor touted these same two essential features, *i.e.*, the "flowchart input form" and the "rule-based approach…to logic synthesis," as what he believed "clearly distinguished" his invention from existing prior art systems in an article around the same time of the '432 patent application. (Ex. 2 at 389).

B. Rule-Based Expert System Software For Translating A Flowchart Input To A Netlist Is The Only Embodiment Of The '432 Patent's Claimed Invention

There is only one embodiment of the system and method of the claimed invention described in the '432 patent and it is referred to as the Knowledge Based Silicon Compiler (also referred to herein as "KBSC"). (Ex. 1 at 2:50-53). As its name suggests, the Knowledge Based Silicon Compiler software is an ASIC design methodology based upon expert systems technology. (*Id*. at 2:53-55). Specifically, the KBSC software uses a flowchart editor to permit non-expert designers to represent the desired ASIC in a flowchart format and generates a netlist from that flowchart input using a rule-based expert system. (*Id*. at 2:55-62). More specifically, the only embodiment described in the '432 patent (the KBSC method) is an ASIC design method consisting of the following four basic steps described in detail in the following paragraphs.

1. ***Step One*: Using The Flowchart Editor of KBSC, The Non-Expert Designer Describes A Sequence Of Operations For The Target ASIC**

In the sole embodiment described in the patent, the first step for defining the flowchart input specification for the ASIC to be designed is for the non-expert designer to represent the sequence of logical operations (*i.e.*, actions and conditions) in a flowchart format using the flowchart editor 21. (Ex. 1 at 2:24-27). The flowchart editor is the user interface software program. It allows the user to display, create and edit flowcharts. (*Id.* at 4:56-59; 7: 6-7). Specifically, the flowchart editor 21 is used to create, edit, and delete the rectangles (actions), diamonds (conditions), and lines (transitions) in the flowchart to represent the series of logical steps and decisions needed to accomplish the task of the desired ASIC. (Ex. 1 at 2:24-27; 3:50-59; 4:15-19; 7:12-23; 8:51-56). The result of this step is shown in the following figure, which is taken from Figure 5 in the '432 patent.



2. ***Step Two*: Using The Flowchart Editor of KBSC, The Non-Expert Designer Specifies A Macro For Each Action And Condition Represented In The Flowchart**

Once the non-expert designer has represented the sequence (or series) of actions and conditions (*i.e.*, operations) for the desired ASIC in the flowchart, the second step in defining input specification for the ASIC to be designed is the designer's use of the flowchart editor to assign (*i.e.*, specify) a definition from the stored definitions (*i.e.*, Macro Library) for each of the actions (rectangles) and conditions (diamonds) represented in the flowchart. (Ex. 1 at 4:61-63; 5:20-22; 7:24-50; 8:23-26). Table 1 from the '432 patent shows a Macro Library containing the definitions for the available actions and conditions that may be specified in the flowchart. The result of this specifying step is shown in Figure 5 of the '432 patent.[2]

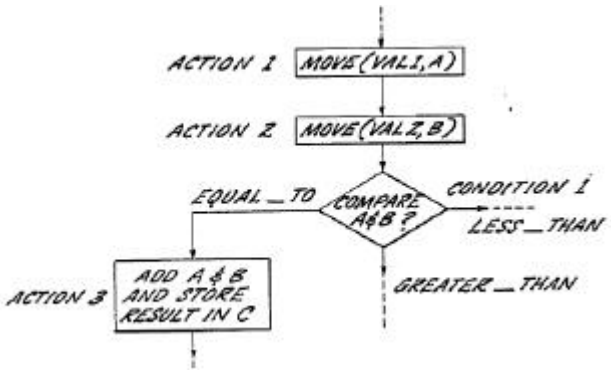


TABLE 1

Macro	Description
ADD (A,B,C)	C = A + B
SUB (A,B,C)	C = A − B
MULT (A,B,C)	C = A * B
DIV (A,B,C)	C = A div B
DECR (A)	A = A − 1
INCR (A)	A = A + 1
CLR (A)	A = 0
REG (A,B)	B = A
CMP (A,B)	Compare A to B and set EQ,LT,GT signals
CMP0 (A)	Compare A to 0 and set EQ,LT,GT signals
NEGATE (A)	A = NOT (A)
MOD (A,B,C)	C = A Modulus B
POW (A,B,C)	C = A B
DC2 (A,S1,S2,S3,S4)	Decode A into S1,S2,S3,S4
EC2 (S1,S2,S3,S4,A)	Encode S1,S2,S3,S4 into A
MOVE (A,B)	B = A
CALL sub-flowchart (A,B, . . .)	Call a sub-flowchart. Pass A,B . . .
START (A,B, . . .)	Beginning state of a sub-flowchart
STOP (A,B . . .)	Ending state of a sub-flowchart

After the definitions have been specified for each operation in the flowchart, as shown for example in Figure 5, the flowchart is then converted to an intermediate file, called a statelist. (Ex. 1 at 7:1-3; 8:56-57).[3]

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[2] Specifically, the ADD (A,B,C) definition from Table 1 is specified for ACTION 3 and the MOVE (A,B) definition from Table 1 is specified for ACTIONS 1 and 2. Similarly, the definition CMP (A,B) from Table 1 is specified for CONDITION 1.

[3] As explained further in Section II.C. below, the statelist is a list form description converted from the flowchart and an example statelist is shown in Appendix A of the '432 patent. (Ex. 1 at 14:7-30).

3. *Step Three*: The Rule-Based Expert System of KBSC Selects The Hardware Cell For Performing Each Definition Specified In The Flowchart

In this step, each definition assigned by the designer using the flowchart editor to each of the actions and conditions represented in the flowchart is matched by the cell selector software program of KBSC to an appropriate corresponding hardware cell description from a library of cells. (Ex. 1 at 5:20-25, 8:23-32):

> The selection is based on the functional descriptions in the flowchart, as specified by the macros assigned to each action represented in the flowchart. …To design a VLSI system from a flowchart description of a user application, it is necessary to match the functions in a flowchart with cells from a cell library.

The cell selector software program of KBSC maps the specified definitions to the hardware cell descriptions using a number of design parameters and constraints such as cell function, process technology used, time delay, power consumption, etc. (Ex. 1 at 8:26-29, 8:60-64, 9:52-61). This makes mapping each specified definition in the flowchart to the appropriate hardware cell description complicated. Consequently, the cell selector must use a rule-based expert system. (Ex. 1 at 5:25-29, 8:29-60):

> The cell selector uses a knowledge base extracted from VLSI design experts to make the cell selection. …This mapping needs the use of artificial intelligence techniques because the cell selection process is complicated…. The Cell Selector uses a rule based expert system to select the appropriate cell or cells to perform each action.

The rule-based expert system's mapping or matching of the specified definitions from the macro library to the hardware cell descriptions in the cell library is illustrated in Figure 4 of the '432 patent.

4. *Step Four*: The Rule-Based Expert System Generates A Netlist Defining The Necessary Hardware Cells And Their Required Interconnection

After the hardware cells have been selected by the rule-based expert system, the KBSC software generates the netlist. (Ex. 1 at 9:64-65). The netlist, as described in the '432 patent, must have all of the necessary hardware cells that are required to implement the designated operations of the ASIC. Thus, the netlist must include a custom controller type hardware cell as well as the data

paths and control paths necessary for connecting the selected hardware cells. (Ex. 1 at 2:34-44; 4:39-43; 5:30-37).

> The netlist 15 includes a custom generated system controller, all other hardware cells required to implement the necessary operations, and interconnection information for connecting the hardware cells and the system controller.

The KBSC software uses a rule-based expert system to generate the controller type hardware cell and the necessary control and data paths that form the required interconnections for all of the hardware cells. (Ex. 1 at Abstract, 5:8-12). After the controller and the data and control paths have been generated, the rule based expert system then eliminates selected hardware cells that are redundant or unnecessary (Ex. 1 at 13:59-66). Finally, the controller, the other necessary hardware cells, and the data and control paths for connecting those hardware cells are used to define the netlist for the desired ASIC. (Ex. 1 at 13:67-14:3).

C. The '432 Patent Does Not Describe A "List Form" Input Specification Embodiment

Ricoh, in its opening brief, claims that the single off-hand mention of a "list form" input in the '432 patent's specification and unasserted claim 2's unsupported requirement that the input means "a list defining the series of actions and conditions" by themselves constitute another described embodiment. (Ex. 1 at 2:21-24; 14:67-15:2). They do not.

The only "list" ever mentioned in the '432 patent is the intermediate file referred to as a statelist. The statelist is not user input, but rather is generated by the KBSC software from the input specification in the flowchart format. (Ex. 1 at 7:1-2, 8:56-57). The '432 patent does not provide any description of the statelist's format, but Appendix A is an example statelist. (*Id*. at 14:7-30).

The only description of this "list form" is provided in United States Patent No. 5,197,016 ("the '016 patent"), issuing from a continuation-in-part application which was filed 18 months later by the two inventors of the '432 patent. (Ex. 3). Specifically, the '016 patent describes an Antecedent-Action-Form ("AAF") that is converted from the input specification in the flowchart

format. (*Id*. at 7:33-9:53). The AAF file examples in the '016 patent are the same as Appendix A in the '432 patent. (Ex. 1 at 14:7-30 with Ex. 3 at 9:26-35 and 9:21-53).[4] Thus, the description in the '016 patent confirms that the only "list" in the '432 patent is not a separate input specific embodiment but is instead a "generated" interim file format.

D. **The '432 Patent Does Not Describe An Embodiment For Automatically Mapping The Stored Definitions**

Ricoh's proposed constructions for the "describing" and "specifying" steps improperly seeks to eliminate the second "specifying" step for defining the input specification for the ASIC to be designed. Specifically, Ricoh's proposed construction for the "describing" step appears to require that the input specification be completely defined in that "describing" step. But then, Ricoh's proposed construction for the "specifying" step confusingly and inconsistently suggests that the "macros may also be 'mapped' automatically." Ricoh's claim construction is contrary to the '432 patent's description because the "specifying" step is the second of the two steps for defining the input specification (*i.e.*, specifying the macros).[5]

To support its construction and oppose Synopsys' and Defendants' construction for the "specifying" step, Ricoh claims that Synopsys' and Defendants' proposal excludes a so-called embodiment where "macros may also be 'mapped' automatically through application of rules." Ricoh bases this claim solely on the following portion of the '432 patent describing the use of rules by the cell selector to generate a blocklist from the statelist. (Ex. 1 at 9:6-18) (Ricoh's quote shown underlined):

> Cell List Generation
>
> FIG. 9 shows the cell list generation steps. The first step of the cell list generation is the transformation of the flowchart description into a structure that can be used by the Cell Selector. This structure is called a statelist. The blocklist is generated from the statelist by

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[4] This description reveals that the AAF file format is nothing more than a descriptive list of the information provided in the flowchart that it was converted from.

[5] The KBSC software cannot define the ASIC to be designed. The designer must provide the specification for the ASIC. In other words, the designer (not the KBSC software) determines the input to the KBSC (*e.g.*, the ASIC design) by assigning the macros to the "series" of actions (rectangles) and conditions (diamonds) represented in the flowchart. The KBSC software is not capable of inferring the macro (specified definition) that should be specified for each rectangle or diamond in the flowchart.

> the inference engine. The blocklist contains a list of the functional blocks to be used in the integrated circuit. Rules of the following type are applied during this stage.
>
> map arguments to data paths
> map actions to macros
> connect these blocks

In its proper context, however, Ricoh's quote from the '432 patent description demonstrates that the "map actions to macros" rule type is applied during the generation of a blocklist containing functional blocks from the statelist. Moreover, the "connect these blocks" rule type in this portion of the specification demonstrates that the "macros" in the "map actions to macros" rule type refers to the functional blocks in the blocklist. Thus, Ricoh's assertion that there is an embodiment for "automatic mapping of stored definitions" is contrary to the '432 patent's description.

IV. THE '432 PATENT'S PROSECUTION HISTORY

A. The Original Application For The '432 Patent

The patent application which led to the issuance of the '432 patent was filed on January 13, 1988 with thirty claims (1-30). (Ex. 4, Original Application). The '432 patent claims 13-17 at issue here correspond to application claims 20-26 in the original application. (*Id.* at 34-36). Application claim 20, later amended to incorporate the limitations recited in application claims 21 and 25 corresponds to the issued claim 13, which is the only independent claim in the present litigation. (*Id.*). A year after the application was filed, on January 18, 1989, the examiner issued an office action rejecting all thirty of the pending claims in the application. (Ex. 4, January 1989 Office Action at 2).

B. The April 18, 1989 Amendment

In response to the examiner's January 13, 1989 rejection of all thirty pending claims, a completely new phrase "architecture independent" was added throughout the patent application in an attempt to distinguish the claimed invention over the prior art. (Ex. 4, April 1989 Amendment at 1-8). Specifically, the phrase "architecture independent" was added to the claims, the specification including the Summary of the Invention, and the Abstract of the Disclosure. (*Id.*). Prior to this amendment, the application described the claimed invention's input as a functional specification comprising a series of actions and conditions. (Ex. 4, Original Application at 30 (Claim 5)).

This amendment limits the '432 patent's claimed invention's input to "architecture independent" functional specifications comprising a series of architecture independent actions and conditions. (Ex. 4, April 1989 Amendment at 8). To distinguish the '432 patent's invention over the functional specifications in the Darringer et al. prior art, this amendment defines "architecture independent functional specifications" as functional specifications that exclude register-transfer level descriptions as defined in the Darringer et al. prior art patent. (*Id*. at 9) (emphasis added):

> A **very clear distinction** between Darringer and the present invention is that the **input to the Darringer system is in the form of a register transfer level flowchart control language**. Darringer et al., U.S. Patent No. 4,703,435, column 4, lines 26-32. …**In contrast**, the application specific circuit designer utilizing the present invention need not possess any expertise common among highly skilled VLSI design engineers since the **input to the present invention is in the form of an architecture independent functional specification**.

A register-transfer level description input by the user would specify the control at the clock cycle level for the ASIC to be designed. (Ex. 5 at 5:27-35). In contrast, the invention in the '432 patent generates a controller, which provides the clock cycle level control, from the described "sequence of operations" represented in the flowchart. (Ex. 4, April 1989 Amendment at 8; *See also*, Ex. 1 at 1:26-28; 2:39-41). Because of this, excluding a register-transfer level description input from the claimed invention is required for the only embodiment in the '432 patent to make sense. Moreover, as emphasized in the April 1989 Amendment, register-transfer level descriptions require the expertise of highly skilled VLSI designers, and therefore such descriptions cannot be encompassed by the '432 patent's claimed invention because they are contrary to its stated goal. (Ex. 4, April 1989 Amendment at 9, 13, 16).

The April 1989 Amendment also establishes that claim 13 requires the use of a rule-based expert system for selecting hardware cells from a hardware cell library. (Ex. 4, April 1989 Amendment at 9-10, 11; see also 17) (emphasis added):[6]

> While Darringer may **synthesize logic** from a register transfer level flowchart description, **it provides no knowledge base** of any kind. **In contrast**, the present invention, …provides **a knowledge base in the**

[6] Application claim 21 is incorporated into issued claim 13 in the November 1989 Amendment.

> **form of a rule based automatic logic synthesis component, *i.e.*, an expert system**. Thus, Darringer does not teach the method of synthesis utilized by the present invention. Furthermore, although it is known in the art of automatic layout to utilize hardware cell libraries, **a rule based expert system has not been utilized to accomplish a task of selection of cells** from the cell library.
>
> * * *
>
> **In contrast**, the present invention, **utilizes a knowledge base which consists of a rule based expert system to synthesize logic**….

Besides requiring the use of a rule-based expert system for selecting the hardware cells, this amendment and the original application also confirm that a rule-based expert system for selecting hardware cells is comprised of a knowledge base of rules for selecting hardware cells and an inference engine for applying those cell selection rules to select appropriate hardware cells from the hardware cell library. (*Id*; Ex. 4, Original Application, (claims 6 and 16) at 30 and 33).

Finally, the Dunn prior art patent demonstrates that rule-based expert systems are substantially different from conventional computer programs that use predefined algorithms. (Ex. 6 at 1:30-56). Specifically, this prior art patent shows that rule-based expert systems use inference methods for applying the rules that make up the knowledge in the field to a solve problems, whereas conventional software programs "solve problems in accordance with pre-defined algorithms and complete data sets." (*Id*.). Thus, this amendment also confirms the substantial differences between using the rule-based expert system software programs of the alleged invention and using the predefined algorithms of conventional software programs of the prior art.

C. **The October 19 1989 Examiner Interview Summary**

Despite the limiting amendments and arguments made by the applicant in the April 1989 Amendment, on August 15, 1989 in a Final Office Action, the examiner again rejected all thirty of the pending claims. (Ex. 4, August 1989 Office Action). As a result of this final rejection of all of the pending claims, the applicant and the examiner participated in an interview.

During that interview, the applicant and the examiner reached an agreement regarding the features of the '432 patent's claimed invention including claim 13 (application claim 20) that distinguished the claimed invention over the Darringer et al. prior art. (Ex. 4, Examiner Interview Summary Record). That agreement unmistakably limits the '432 patent's claimed invention's input

to a flowchart format. The agreement also unmistakably limits the '432 patent's claimed invention to the translation of that flowchart input to a netlist through the use of an expert system. (*Id.*) (emphasis added):

> It is **agreed** that the **features** "flowchart editor" and "expert system for translating the flowchart into a netlist defining the necessary hardware cells of the integrated circuit" are patentable [*sic*] distinct from the reference identified above. Thus, applicant's attorney **will** amend the claims to include **those features**.

The "flowchart editor" feature is the software module operable by a designer and provides the means for the designer to enter the architecture independent functional specification by performing the following two steps: 1) creating a flowchart having boxes representing actions, diamonds representing conditions, and lines with arrows representing the transitions between those actions and conditions; and 2) specifying for each box or diamond a particular action or condition from the available stored definitions (*i.e.*, the Macro Library). (Ex. 4, Original Application at 13:1-14:45, 16:29-17:4). Thus, the agreement reached by the applicant with the examiner without a doubt limited both the "describing" and "specifying" steps of claim 13 (application claim 20) to the use of a flowchart format.

D. **The November 15, 1989 Amendment**

Shortly after reaching the agreement with the examiner, on November 15, 1989, the applicant filed an amendment. (Ex. 4, November 1989 Amendment). In that amendment the applicant amended claim 13 (application claim 20) to incorporate the language of application claim 21 and to add the step of application claim 25. (Ex. 4, November 1989 Amendment at 4-5):

These amendments are consistent with the agreement reached between the applicant and the examiner. First, they limit the "selecting step" by requiring that it be done using a rule-based expert system. (Ex. 4, November 1989 Amendment at 7).

Second, they define the "expert system for translating" feature as a knowledge base containing the cell selection rules and an inference engine for applying those rules to select the appropriate hardware cells. (Ex. 4, November 1989 Amendment at 2, 8) (emphasis added):

> an expert system including a knowledge base containing rules for selecting hardware cells from said cell library and **inference engine** means for selecting appropriate hardware cells from said cell library in accordance with the rules of said knowledge base

* * *

> Claim 5 has also been amended to clearly distinguish it over the cited prior art by more clearly defining the expert system aspects of applicants' invention including the provision of a knowledge base containing rules for selecting hardware cells, [and] inference engine means for selecting appropriate hardware cells . . .

Third, the amendment also unmistakably confirms that the input of the claimed invention does not encompass functional specifications that include register-transfer level descriptions. (Ex. 4, November 1989 Amendment at 6-7) (emphasis added):

> [T]he **present invention distinguishes fundamentally over the prior art** by providing a system and **method for designing** an application specific integrated circuit at an **architecture independent** functional behavioral level. Thus, it is **not necessary for the user to have the specialized expert knowledge of a highly skilled VLSI design engineer**.
>
> * * *
>
> [I]t is clear from a complete reading of the patent specification in context that the specifications used by **Darringer et al. are not truly at an architecture independent level**, but rather are at a lower level which is indeed hardware architecture dependent and **defines the system at a "register-transfer" level description**. This is quite clear from the description at column 5 beginning at line 27.

Thus, this amendment demonstrates that specifications that include "register-transfer" level descriptions are not "architecture independent" and therefore, are not encompassed by the '432 patent's claimed invention. (*Id.*). Darringer et al. at 5:27-35 (Ex. 5) defines register-transfer level descriptions as a description that defines any control needed for the ASIC and consists of: 1) defining the inputs, outputs, and any registers of the proposed ASIC; and, 2) describing for a single clock cycle of the ASIC how the ASIC outputs and any registers are set according to the values of the ASIC inputs and the previous values of the registers.

As demonstrated above, one of ordinary skill in the art would understand that the '432 patent's file history unmistakably limits the '432 patent's claimed invention in three critical ways. First, the file history limits the claimed invention's input by excluding functional specifications having register-transfer level descriptions. Second, the input of the claimed invention is also limited to a flowchart format. Finally, the file history unambiguously requires that in translating the flowchart to a netlist, the step of selecting the hardware cells must be performed by a rule-based

expert system having an inference engine for applying the cell selection rules stored in the knowledge base of that rule-based expert system.

V. SYNOPSYS' POSITIONS ON THE PROPER CONSTRUCTION OF THE DISPUTED CLAIM TERMS IN THE '432 PATENT

In the following sections the proper meaning of the disputed claim terms of claims 13-17 will be discussed in the following manner. First the proper meanings for the disputed claim terms in claim 13 will be addressed and then the proper meanings for the disputed claim terms for claims 14-17 will be addressed. In addressing the proper meaning of claim terms for claim 13, all of the limitations are discussed, however, for clarity of explanation relating to the claimed method, the claim limitations have been loosely grouped as follows: preamble terms, input related issues, hardware cell selection using a rule-based expert system related issues, and the remaining limitations of the claim.

A. The Proper Construction of "A Computer-Aided Design Process For Designing"

The dispute regarding this claim limitation concerns Ricoh's inclusion of the phrase "during manufacture of a desired application specific integrated circuit (ASIC) chip that is designed to perform a specific purpose" and Synopsys' and Defendants' use of the phrase "as distinguished from a computer-aided manufacturing process, which uses a computer to direct and control the manufacturing process" in their respective proposed constructions. This dispute centers on Ricoh's effort to manufacture an argument that the "computer-aided design processes for designing application specific integrated circuits" somehow constitute processes "that are directly used in the manufacture of ASICs" pursuant to 35 U.S.C. § 271(g). Because Ricoh's proposal is contrary to the '432 patent's public record and Synopsys' and Defendants' proposal properly highlights the distinction between computer-aided design and computer-aided manufacturing as understood by persons of skill in the art from the '432 patent's public record, Ricoh's litigation induced attempt to alter the public record should be rejected.

First, the language in this limitation plainly provides that the claimed processes for claims 13-17 are "computer-aided design process for designing." (Ex. 1 at 16:34). The language is unambiguous to a person of skill in the art and does not support the inclusion of a computer-aided

manufacturing process. There is also nothing in the remaining claim limitations for claims 13-17 that supports broadening the claim to include anything other than design. In fact, the other limitations in the claims demonstrate that the claimed processes solely produce information or data representing the design of the desired ASIC. (Ex. 1 at 16:60-68) ("netlist" and "mask data").

Second, the '432 patent's description also states plainly that the invention "relates to the design of integrated circuits, and more particularly relates to a computer-aided method…for designing integrated circuits." (Ex. 1 at 1:9-12). This is consistent with the '432 patent's title: "Knowledge Based Method And Apparatus For **Designing** Integrated Circuits Using Functional Specifications." (Ex. 1) (emphasis added). Thus, like the claims, the '432 patent specification also demonstrates that the processes of claims 13-17 only produce information representing the design for the desired ASIC, *i.e.*, netlists and mask data. (Ex. 1 at 4:35-46).

Not only is Ricoh's proposed construction contrary to the '432 patent's claims and its specification, but it is also inconsistent with the statements made in the '432 patent's file history. Specifically, the April 1989 Amendment provides: "The present invention is a computer-aided design…method whereby the user can design application specific integrated circuits…." (Ex. 4, April 1989 Amendment at 8). Nothing in the '432 patent's file history supports Ricoh's attempt to broaden the claims to include a manufacturing process for a desired application specific integrated circuit (ASIC) chip.

Last, Ricoh's proposal seeks to distort the obvious distinction between "manufacturing" and "designing" an ASIC as understood by persons of ordinary skill in the art from the '432 patent's public record. Specifically, persons of skill in the art recognize that the processes for designing ASICs and the processes for manufacturing ASICs are separate, complex, and distinct sets of processes and that the processes for designing ASICs are simply **not** part of any of the processes for manufacturing ASICs. (Kowalski Decl. ¶¶ 7-10, 16-18, 65-66; *see also*, Ex. 7 at 7-24; Ex. 8 at 76-82 and 274-278).

In fact, the processes for design and the processes for manufacturing are separated by a third distinct and often-proprietary set of complex and expensive processes for manufacturing the photomasks (also known as masks) used in the manufacturing processes. (*Id.* ¶¶ 9, 18). Because of

the prohibitive cost of manufacturing these photomasks more than once for an ASIC chip, the goal of the designer is to perform these design processes only once. (*Id.* ¶ 18). Once the design is completed and the photomasks are made, the design processes (such as those in the '432 patent) are not performed again absent a desire or need to change the ASIC's design. This is vastly different from the ASIC manufacturing processes that must be performed each time the ASIC chips are made. *Id.*

Ricoh relies on statements that the "netlist" and/or "mask data" are "required" or "needed" "to produce the particular application specific integrated circuit in chip form" as support for its construction. (*See e.g.*, Ex. 1 at 2:44-49). But that does not mean that the '432 patent's "design" processes for generating design "data" are themselves part of the manufacturing process of the actual ASIC chips. A chip must be designed before it is manufactured and thereby produced.[7] However, this does not support Ricoh's attempt to blur the distinction between the manufacturing processes and the design processes for designing an ASIC. Design processes, like those claimed by claims 13-17, are simply not processes that are used to directly manufacture ASICs. In fact, in another article, the '432 patent's inventor recognizes that "design" processes and "manufacturing" processes are separate and distinct. (Ex. 9 at 364-365). Ricoh's proposal directly conflicts with the understanding of this claim limitation by persons skilled in the art.

B. **The Proper Construction of "Application Specific Integrated Circuit (ASIC)"**

The '432 patent explicitly defines this phrase as follows: "An application specific integrated circuit (ASIC) is an integrated circuit chip designed to perform a specific function, as distinguished from standard, general purpose integrated circuits, such as microprocessors, memory chips, etc." (Ex. 1 at 1:13-17). Defendants and Synopsys added the definition of "integrated circuit" for clarity.[8]

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[7] All of the statements relied on by Ricoh are consistent with the understanding of persons of skill in the art that "mask data" is used to manufacture the photomasks (also known as masks) that are in turn subsequently used in the other distinct and separate processes that are directly used in the actual manufacture of the ASIC chips. (Kowalski Decl. ¶ 8-9, 65-66).

[8] Ricoh's states (at page 13, footnote 9) that it does not oppose keeping the phrase "as distinguished from standard, general purpose integrated circuits, such s microprocessors, memory chips, etc." Yet, Ricoh still seeks to eliminate the phrase "as distinguished from standard, general purpose integrated circuits, such as microprocessors, memory chips, etc." from the definition of ASIC. Ricoh's attempt to exclude this "explicit" language from the '432 patent's definition of ASIC simply because it deems it to be "implicit" in its proposed definition is contrary to the '432 patent and should be rejected.

Synopsys' and Defendants' proposal for this disputed claim phrase, unlike Ricoh's proposal, incorporates the '432 patent's entire explicit definition for ASIC and comports with the meaning that one of skill in the art would assign to this phrase. (Ex. 1 at 1:13-17; Kowalski Decl. ¶ 19). The Court should, therefore, adopt Synopsys' and Defendants' proposed construction for "application specific integrated circuit."

C. The Claim Limitations Directed To The Input Of The Claimed Method For Claims 13-17

The following three claim limitations are directed to the input for the claimed processes of claims 13-17 for the '432 patent:

1. storing a set of definitions of architecture independent actions and conditions;
2. describing for a proposed application specific integrated circuit a series of architecture independent actions and conditions;
3. specifying for each described action and condition of the series one of said stored definitions which corresponds to the desired action or condition to be performed.

These three claim limitations should be construed consistently and as provided in portions C, D, E, K, L, and M in Synopsys' column of the Joint Claim Construction Chart. Specifically, these three claim limitations limit the input steps for the claimed method of claims 13-17 by requiring that:

1. the designer represents a sequence of logical steps and decisions in a flowchart format;
2. the designer assigns one stored definition for each logical step and decision described in the flowchart;
3. the flowchart input specification excludes a register transfer level (RTL) description, which defines any control at the clock cycle level needed for the ASIC.

Ricoh proposes constructions for these three claim limitations that attempt to alter the indisputable public record for the '432 patent and recapture claim scope that was relinquished to obtain allowance of claims 13-17. As demonstrated below, these three requirements are not only dictated by the public record for the '432 patent but are also consistent with the ordinary meaning of the claim language and the extrinsic evidence including expert testimony.

1. The Designer Represents A Sequence Of Logical Steps And Decisions In A Flowchart Format

The "describing for a proposed application specific integrated circuit a series of architecture independent actions and conditions" claim language dictates that the "describing" be of "a series of

actions and conditions." Specifically, the prepositional phrase "for a proposed application specific integrated circuit" refers only to the fact that this "describing" step is performed for the proposed ASIC. The dispute here is focused on what is required by the language "describing . . . a series of architecture independent actions and conditions" in this step.

The '432 patent's specification defines the "describing . . . a series of architecture independent actions and conditions" step in claim 13 to require that "the designer represents a sequence of logical steps and decisions in a flowchart format." (Ex. 1 at Figs. 1a, 5, & 7; 2:21-27; 3:20-22; 3:50-59; 4:5-22; 4:35-38; 7:12-23). There is no question that the goal of the '432 patent is to make it possible for technicians not having VLSI design expertise to design ASICs. (Ex. 1 at 1:17-19; 2:14-20). The '432 patent plainly provides that this is achieved by allowing non-expert designers to define the input specifications for the proposed ASIC by representing a sequence of logical steps and decisions in a flowchart format. (Ex. 1 at 2:21-27, 4:11-18, 4:29-34). Not only is the ability to work with and define the input for the desired ASIC essential to achieve the '432 patent's goals but the flowchart editor software program is the only user interface described in the '432 patent. (Ex. 1). Moreover, despite Ricoh's claim to the contrary, the off-hand mention in the '432 patent to a "list format" without any explanation or any other description in the '432 patent as well as the use of the words "preferred" or "preferably" in describing the one and only flowchart input form embodiment in the '432 patent are simply not enough to support a broader interpretation for this step. *See e.g.*, *Biogen*, 318 F.3d at 1140 (Claims do not "'enlarge what is patented beyond what the inventor has described as [his] invention.'") (quoting *Network*, 242 F.3d at 1352); *Wang Labs.*, 197 F.3d at 1383 ("The usage 'preferred' does not of itself broaden the claims beyond their support in the specification.").

To the extent that there is any doubt that the '432 patent's specification requires that "the designer represents a sequence of logical steps and decisions in a flowchart format," such doubt is obliterated by the '432 patent's file history. Specifically, the file history unmistakably demonstrates the input of the claimed invention is limited to the designer's use of a flowchart editor to represent a sequence of logical steps and decisions in a flowchart format. (Ex. 4, April 1989 Amendment at 11; October 1989 Examiner Interview Summary; November 1989 Amendment at 7). The flowchart editor allows the designer to represent a sequence of operations in a flowchart having boxes

representing actions, diamonds representing conditions, and lines with arrows representing the transitions between those actions and conditions. (Ex. 4, Original Application at 13:1-11).

Like the specification, the file history also claims that the ability of non-expert designers to work with and define the input of the claimed invention is what distinguishes the '432 patent's invention over the prior art. (*See e.g.*, Ex. 4, April 1989 Amendment at 8). Time after time in the file history, the '432 patent's input specification was distinguished over the input specifications of the prior art cited during the file history because those inputs required the designer to posses specialized expert knowledge. (Ex. 4, April 1989 amendment at 9, 11-14, 16, 17, November 1989 amendment at 7). Thus, like the specification, the file history stresses the importance of enabling non-expert designers to design ASICs by allowing them to work with simple flowchart inputs to represent only the necessary logical steps.

Besides being dictated by the public record—*i.e.*, the '432 patent, its file history, and the cited prior art—the requirement that "the designer represents a sequence of logical steps and decisions in a flowchart format" is also supported by the dictionary definitions for the words describe, series, sequence, and operation. (Ex. 10 at 479; Ex. 11 at 343, 1073, 1074). These definitions are consistent with a requirement that the sequence of operations be represented in a flowchart format. (*Id.*).

Despite the overwhelming evidence in the '432 patent's public record, Ricoh proposes a construction that fails to acknowledge that the input specification of the '432 patent's claimed invention (including claims 13-17) is limited to a flowchart format. To support its position that the input specifications are not limited to a flowchart format Ricoh argues that: (1) the Examiner Interview Summary reflected only the examiner's beliefs and cannot be deemed an agreement reached between the examiner and applicant limiting the claims to a flowchart format; (2) that unlike some of the other claims, claims 13-17 were not amended and did not explicitly include the flowchart format feature of those other claims; and (3) requiring that the input specification be in a flowchart format would improperly exclude the so-called "list form" embodiment. Ricoh's arguments are neither supported by the intrinsic evidence nor the legal principles for claim construction.

First, contrary to Ricoh's claim, the Examiner Interview Summary explicitly states that the examiner and the applicant reached agreement. Specifically, the Examiner Interview Summary form

shows that the examiner checked the box providing: "**Agreement was reached** with respect to some or all of the **claims** in question." (Ex. 4 at October 1989 Interview Summary). After identifying all the claims discussed (which included claim 13 (application claim 20)), this Summary Form then provides the following lead-in to the examiner's summary. (Id.). ("Description of the general nature of **what was agreed to** if an agreement was reached, or any other comments:"). The actual summary then provides: "It is **agreed** that the features '**flowchart editor'** and 'expert system for translating the **flowchart** into a netlist defining the necessary hardware cells of the integrated circuit' are patentable [*sic*] distinct from the reference identified above." (*Id.*). The Examiner Interview Summary, read objectively, establishes that agreement was reached and that the features "**flowchart editor**" and "expert system for translating the **flowchart** into a netlist" were the examiner's only basis for allowing all of the claims including claim 13. *See, Biogen*, 318 F.3d at 1139 (district court correctly limited the claims based on objective reading of examiner's statements).

Equally misguided is Ricoh's argument that "[i]f the patentee intended to limit the patent claim 13 to the same scope (*i.e.*, flowchart format), the patentee would have used the same language, or at least added the term "flowchart" to patent claim 13, as patentee had done for patent claim 18." The Federal Circuit has flatly rejected this same argument. *See e.g., Biogen*, 318 F.3d at 1139; *ACCO Brands*, 346 F.3d at 1079 ("'It is incorrect to construe a claim as encompassing the scope that was relinquished in order to obtain allowance of another claim, despite a difference in words used.'") (emphasis added). Thus, neither Ricoh's failure to amend claim 13, nor the fact that claim 13 does not use the word "flowchart" change the unmistakable disclaimer in the '432 patent's file history relinquishing all formats other than the flowchart format.

Ricoh's argument that limiting claims 13-17 to a flowchart format improperly excludes so-called "list form" embodiment again ignores the intrinsic evidence as well as the Federal Circuit's precedent on claim construction. First, there is no "list form" preferred embodiment described in the '432 patent. *See* Section II.c. Moreover, the mere mention of a this "list form" cannot expand the claims beyond what is described and therefore, supported by the '432 patent's description. *See Wang Labs.*, 197 F.3d at 1383; *Bell Atl. Network*, 262 F.3d at 1273; *See also, Biogen*, 318 F.3d at 1140 (Claims do not "enlarge what is patented beyond what the inventor has described as [his] invention.")

(quoting *Network*, 242 F.3d at 1352). Besides, even assuming that there were a "list form" input specification embodiment described in the '432 patent (which there is not), here the unmistakable disclaimer in the '432 patent's file history of any input specification formats other than the flowchart format mandates excluding the disclaimed embodiment, even if it is a preferred embodiment. *See Springs Window Fashions*, 323 F.3d at 996; *Rheox, Inc.*, 276 F.3d at 1327 (disclaimer in file history is highly persuasive evidence warranting exclusion of preferred embodiment). Thus, Ricoh's arguments do not change the fact that the claimed invention of the '432 patent's input specifications is properly limited to a flowchart format.[9]

Finally, aside from its failure to acknowledge the requirement that the input specification must be in a flowchart format, Ricoh's proposed construction is also contrary to the claim language because it eliminates the requirement that the designer must describe "a series." Instead, Ricoh's proposal merely requires an input specification "containing the desired functions." Not only does this contradict the actual words used in the claim (*i.e.*, "describing…a series") but it is also contrary to the requirement in the patent's description that the designer must "describ[e] a sequence of logical operations." (Ex. 1 at 2:24-27). Last, Ricoh's construction would render the claimed method of claims 13-17 inoperative because without an input specification "describing the sequence" of the necessary logical steps and decisions to complete the ASIC's task, the necessary controller for synchronizing the operation of the other hardware cells could not be generated. (Kowalski Decl. ¶ 49). Thus, the Court should reject Ricoh's proposed construction and instead adopt Synopsys' and Defendants' proposal.

2. **The Designer Assigns One Stored Definition For Each Logical Step And Decisions Described In The Flowchart**

The "specifying for each described action and condition of the series one of said stored definitions which corresponds to the desired action or condition to be performed" claim language

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[9] In fact, this requirement is also consistent with the inventor's own contemporaneous article, which claims that the flowchart input form is vital to system design and clearly distinguishes his invention from the prior art on this basis. (Ex. 2 at 379, 389).

requires that the "specifying" be of "one of said stored definitions which corresponds to the desired action or condition to be performed." Specifically, the prepositional phrase "for each described action and condition of the series" refers only to the fact that this "specifying" step is performed for each action and condition in the described series resulting from the previous "describing" step. Thus, the claim language for this "specifying" step requires that "the designer assigns one stored definition for each logical step and decision described in the flowchart."

Not only is this requirement mandated by the claim language but it is also apparent from the other '432 patent claims. Specifically, these other claims demonstrate that for each action and condition (operations) described, this step requires the designer to "specify" one stored definition (macro from a macro library) and that this "specifying" step and the previous "describing" step together are the steps that define the input specification for the claimed invention's method. (Ex. 1, claim 1 at 14:41-46, claim 9 at 15:39-45, claim 11 at 16:9-17). These other claims show that the functional input specifications of the '432 patent's claimed invention are defined by the designer in two separate steps: the first is the "describing" of the sequence of operations for the proposed ASIC in a flowchart and the second is the designer's "specifying" of one stored definition for each of those described operations in the flowchart. (*Id*.)

Besides being required by the language of the '432 patent's claims, the requirement that "the designer assigns one stored definition for each logical step and decision described in the flowchart" is also supported by the specification. Specifically, the '432 patent also demonstrates that this "specifying" step and the previous "describing" step together are the steps that define the input specification for the claimed invention's method and that the "specifying" step requires the designer to assign one stored definition (macro) for each logical step and decision (operation) described in the flowchart. (Ex. 1 at 5:20-22; 7:24-26; 8:51-55); (*See also,* Ex. 1 at Fig. 5, 3:20-22; 4:61-63; 8:23-26) Finally, the requirement that the "designer" does the "assigning" of the stored definitions is also consistent with the dictionary definition for "specify." (Ex. 11 at 1132) (Specify – to name or state explicitly or in detail; to include as an item in a specification). These definitions imply that "specifying" is an act performed by a person.

Ricoh's proposed construction is contrary to the actual words used in the claim. First, the claim language unambiguously requires that this "specifying" step be performed "for each described action and condition of the series." Ricoh's proposal improperly seeks to eliminate this explicit connection between the "describing" and the "specifying" steps by replacing the phrase "for each described action and condition of the series" with the phrase "for each desired function to be performed by the desired ASIC." Ricoh's attempt to broaden this unambiguous claim language is simply not supported by the '432 patent's public record and is in fact contrary to it.

Ricoh also wrongly claims that the term "specifying" is redefined by the '432 patent's specification to mean "mapping or associating a desired function to be performed by the manufactured ASIC with a definition from the library of definitions." Ricoh attempts to support this extraordinary redefinition of the word "specifying" by: (1) quoting to portions of the '432 patent that actually support Synopsys' and Defendants' proposed construction (*See e.g.*, Ex. 1 at 7:24-25); and (2) claiming that this redefinition is necessary to avoid excluding yet another so-called embodiment in the '432 patent.

First, the '432 patent demonstrates that this "specifying" refers to the designer assigning one stored definition for each described action and condition in the series of the previous "describing" step. (Ex. 1 at 7:24-26; 8:51-56). Thus, "specifying," consistent with its ordinary dictionary meaning and description in the '432 patent's specification refers to the "designer's assigning" and not to any automated "mapping or associating" as Ricoh claims. Second, contrary to Ricoh's claim, there is no embodiment described in the '432 patent for "automatically mapping" each described action and condition in the series with the stored definitions for those actions and conditions. *See* Section II. d.[10] Besides, even if there were an automatic mapping embodiment (which there is not), the existence of such an alternative embodiment, by itself, would not support the extraordinary redefinition of "specifying" proposed by Ricoh.

[10] Equally misguided is Ricoh's argument that Synopsys' and Defendants' construction for this step is "particularly improper" because it excludes this nonexistent embodiment.

3. The Flowchart Input Specification Excludes A Register Transfer Level (RTL) Description, Which Defines Any Control Needed For The ASIC At The Clock Cycle Level

This dispute centers on the effect of Ricoh's adding the completely new phrase "architecture independent" throughout the patent application in an attempt to distinguish the claimed invention over the prior art, including Darringer et al. (Ex. 4, April 1989 Amendment at 1-8). Specifically, the phrase "architecture independent" was added to the claims, and the specification including the Summary of the Invention, and the Abstract of the Disclosure. (*Id.*).[11]

Ricoh added this vague phrase to argue before the United States Patent Office that the phrase "architecture independent" distinguished the claimed invention over prior art functional specifications because they include register-transfer level descriptions. Now, however, standing before this Court, Ricoh wishes to take the diametrically opposed position, *i.e.*, that register-transfer level descriptions are not excluded by the phrase architecture independent. This is a classic example of ignoring the public record and treating the claims as a nose of wax.

The original application for the '432 patent was directed towards the input of functional specifications, which were comprised of a series of actions and conditions. (Ex. 4, Original Application at 1, 3, 4-5, 6, 7, 8, 29, 30, and 34). The original application for the '432 patent and the issued '432 patent demonstrate that the "series of actions and conditions" are the "sequence of logical operations" necessary to complete the task of the ASIC to be designed and that those logical operations consist of actions (steps) and conditions (decisions). (Ex. 1 at 2:24-27; 3:20-22; 3:52-55; 6:1-54; Ex. 4, Original Application at 5:12-13; 6:11-13; 10:21-12:9). The question here is: how did Ricoh's adding of the phrase "architecture independent" alter the meaning of the "series of actions

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[11] The phrase "architecture independent" is vague and imprecise. (Kowalski Decl. ¶ 22). It is also not defined in the '432 patent. (Ex. 1). Because this phrase is used in claims 13-17, therefore, it renders them all invalid for failing to meet the "definiteness" requirement of 35 U.S.C. § 112. U.S.C. § 112 ¶ 2. ("The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). In addition to being invalid pursuant to § 112, claims 13-17 are also invalid because the addition of "architecture independent" to the claims and specification constituted "new matter," which is prohibited by 35 U.S.C. § 132. 35 U.S.C. § 132(a). ("No amendment shall introduce new matter into the disclosure of the invention.").

and conditions" that comprise the input functional specifications of the claimed invention? The file history provides the answer to that question.

The prior art described functional input specifications. (*See e.g.*, Ex. 5 at 5:21-26; 14:61-63). The applicant admitted this fact during the file history. (Ex. 4, April 1989 Amendment at 9). Because of this, the patent examiner properly rejected all of the claims. (Ex. 4, January 1989 rejection at 1-3). More than a year after the original application was filed, the applicant added the phrase "architecture independent" to distinguish the cited prior art. (Ex. 4, April 1989 amendment at 1-10).

At the same time that the applicant added the phrase "architecture independent" to the specification and all of the claims, the applicant repeatedly argued that the input specifications of the prior art including Darringer et al. were not "architecture independent" simply because their input specifications included register-transfer level descriptions. (Ex. 4, April 1989 Amendment at 9 and 12-13, November 1989 Amendment at 7). Because of this amendment and the arguments made by the applicant in the '432 patent's file history, the applicants addition of "architecture independent" to the claims excluded register-transfer level descriptions from the claimed invention. (Ex. 4, April 1989 amendment at 9 and 2-13, November 1989 amendment at 7). In other words, the applicant argued that the claimed invention was different from the prior art because it excluded register-transfer level descriptions (*See e.g.*, Ex. 4, April 1989 Amendment at 9). The file history, therefore, unmistakably demonstrates that "architecture independent" excludes register-transfer level descriptions and that anything including register-transfer level descriptions cannot be encompassed by the claimed invention. *See Springs Window Fashions*, 323 F3d at 995-96. This is again consistent with the inventor's own contemporaneous article, which provides that the input of his invention "is not an RT-level description." (Ex. 2 at 388).

The file history and the Darringer et al. prior art also show that register-transfer level descriptions are descriptions that define any control needed for the ASIC at the clock cycle level, which consists of: 1) defining the inputs, outputs, and any registers of the proposed ASIC; and, 2) describing for a single clock cycle of the ASIC how the ASIC outputs and any registers are set according to the values of the ASIC inputs and the previous values of the registers. (Ex. 5 at 5:27-

35); *See Kumar*, 351 F.3d at 1368 (adopting definition of term in cited prior art which is intrinsic evidence).

Ricoh proposes a definition for "architecture independent actions and conditions" that would include any "functional or behavioral aspects of a circuit (or circuit segment) that does not imply any set architecture, structure, or implementing technology." Ricoh's definition improperly ignores the fact that the phrase "architecture independent" was not in the original application and was added along with repeated arguments that adding the phrase "architecture independent" limited the functional specifications (comprised of a series of actions and conditions) by excluding register-transfer level descriptions that were included in the prior art functional specifications.

First, Ricoh attempts to mask the fact that its definition of "architecture independent" was formed through the improper use of a general-usage dictionary's definitions for the terms "architecture" and "independent" by taking issue with Synopsys' and Defendants' defining "architecture independent" and "actions and conditions" separately. Synopsys' and Defendants' definition, which takes into account the affect of adding the completely new phrase "architecture independent" to the claims and the specification in light of the '432 patent's file history is certainly proper and mandated by Federal Circuit authority. In contrast, Ricoh's attempt to define the technical phrase "architecture independent" with a general-usage dictionary is improper and should be rejected. *See Vanderlande*, 366 F.3d at 1321 (where one of skill in the art would attach no meaning at all to claim term general-usage dictionaries are irrelevant).

Second, Ricoh incorrectly claims that its definition "can be ascertained from the '432 patent." To support this conclusion, Ricoh relies on FIG. 1a and portions of the specification, which were also amended to include the phrase "architecture independent." (Ex. 1 at 2:6-14; 3:50-57). These portions of the '432 patent support Synopsys' and Defendants' proposal for "actions and conditions," *i.e.*, "the logical steps and decisions that are represented as rectangles and diamonds in the flowchart." Because the specification and the claims were both amended to add the phrase "architecture independent," these portions of the patent do not provide any guidance on the difference between "architecture independent actions and conditions" of the amended '432 patent application and the "actions and conditions" of the original '432 patent application. Thus, Ricoh's definition of

the technical phrase "architecture independent," which is improperly formed from the general-usage dictionary definitions of the words "architecture" and "independent," should be rejected.

Next, Ricoh misleadingly claims that Synopsys' and Defendants' claim construction proposal, which gives effect to the unmistakable disclaimer of subject matter in the file history, is an improper non-infringement argument. Ricoh is wrong. Synopsys' and Defendants' proposal properly relies on the indisputable public record to show that Ricoh disclaimed the "register-transfer" level descriptions described in the Darringer prior art from the scope of its claimed invention. *See e.g., Southwall*, 54 F.3d at 1576.

In fact, it is Ricoh that makes infringement arguments in its opening brief. Specifically, Ricoh, recognizing that its repeated arguments to the patent office disclaimed functional specifications that included register-transfer level descriptions from the scope of the claimed invention, argues now that the Court should "clarify" that only "basic" or "primitive RTL" was disclaimed from the scope of the claimed invention and not "functional RTL." Not surprisingly, Ricoh then characterizes the Verilog and VHDL hardware description languages ("HDLs") it accuses of infringement as examples of "functional" register-transfer level languages. This directly contradicts the '432 patent's file history where Ricoh repeatedly distinguished the prior art HDLs, which Ricoh claimed required the VLSI design expertise that is not required for using the method of the claimed invention. (Ex. 4, April 1989 Amendment at 9, 11, 13, 15 and 17; *see e.g.*, Ex. 12 at 3, 7; Ex. 13 at 73-74). Ricoh's made up distinction is not only contrary to the file history but it also finds no support in the other parts of the '432 patent's public record or anywhere else.

In fact, the '432 patent's public record fails to provide any support for Ricoh's conjured up distinction between "basic" or "primitive RTL" and "functional RTL." The '432 patent's public record never mentions the terms "basic RTL," "primitive RTL," or "functional RTL." Ricoh attempts to support its distinction by simply mischaracterizing the Darringer prior art patent. Specifically, Ricoh claims that the Darringer prior art patent describes a "'basic' or 'primitive Boolean'-type" of register-transfer level description simply because the register transfer-level description can be translated into AND/OR (*i.e.*, Boolean) logic. Ricoh is wrong.

The Darringer prior art patent specifically defines a register-transfer level description and the subsequent translation or transformation steps described in that patent do not alter this explicit definition. (Ex. 5, 5:27-35). Given this and the fact that the '432 patent file history explicitly disclaims all register-transfer level descriptions without a single reference to any so-called "basic," "primitive," or "functional" "types" of RTL, Ricoh's completely unsupported attempt to limit the unmistakable disclaimer of register-transfer level descriptions should be rejected out-of-hand.

Last, Ricoh again mischaracterizes the '432 patent's description in yet another attempt to claim that Synopsys' and Defendants' proposed construction excludes a preferred embodiment. Specifically, Ricoh claims that the example functional specification shown in FIG. 10 mandates a narrowing of the prosecution history disclaimer. FIG. 10 merely shows a sequence of actions and conditions with specified macros but without any register-transfer level description. Ricoh does not point to anything in FIG. 10 that meets the Darringer patent's definition of a register-transfer description. Besides its failure to support this argument, even if an interpretation excluded an example described in the patent (which is not the case here), Ricoh's unmistakable disclaimer in the '432 patent's file history of any input functional specifications that include a register-transfer level description warrants excluding even a preferred embodiment. *See Springs Window Fashions*, 323 F3d at 996; *Rheox, Inc.*, 276 F.3d at 1327.

D. **The Proper Construction of "Data Describing A Set Of…Hardware Cells…"**

This claim limitation "storing data describing a set of available integrated circuit hardware cells for performing the actions and conditions defined in the stored set" should be construed consistently and as provided in portions F and G in Synopsys' column of the Joint Claim Construction Chart. Specifically, this claim limitation limits the claimed invention of claims 13-17 by requiring that: 1) there be at least one hardware cell for each stored definition; and, 2) each named hardware cell has corresponding descriptions at the functional level, logic level, circuit level, and layout level that are all defined.

Claim 13 and the '432 patent specification requires that there be at least one hardware description for each of the stored definitions (macros in the macro library). (Ex. 1 at FIG. 4; 5:22-25) ("For each macro function in the macro library 23 there may be several hardware cells in the cell

library 34 . . . "). Because it is necessary to match a hardware cell description for each stored definition specified in the flowchart, there must be at least one hardware cell description for each stored definition that can be specified. (Ex. 1 at 8:31-33). Thus, the ability to design ASICs depends on the fact that there is at least one hardware description for each of the stored definitions. (*Id.*).

Not only is this requirement supported by the '432 patent but the claimed method for claims 13-17 would be inoperative if there were not at least one corresponding hardware cell description to match to the stored definitions that have been specified in the flowchart. Therefore, there must be at least one hardware description for each of the stored definitions that can be specified in the flowchart. Otherwise, accepting Ricoh's position, the method would not be able to generate a netlist if one of the specified stored definitions was a stored definition without any corresponding hardware description to which it could be mapped. Despite this, Ricoh simply argues, without any explanation, that there is no support for this requirement. The Court should adopt Synopsys' and Defendants' proposal.

Claim 13 and the '432 patent specification also require that each named hardware cell have corresponding descriptions at the functional level, logic level, circuit level, and layout level that are all defined. (Ex. 1 at Fig. 4; 2:34-39; 3:59-67; 5:15-20; 5:23-25; 9:24-51). Specifically, the specification defines the "data describing" the hardware cells as descriptions at the functional level, logic level, circuit level, and layout level. (Ex. 1 at 9:24-34). Additionally, such information is essential for matching the specified stored definitions to these hardware cell descriptions and for producing the netlist and mask data for the ASIC. (Ex. 1 at 5:15-20; 8:60-64). Simply stated, without these functional, logic, circuit, and layout level definitions for each hardware cell, the ASIC could not be designed using the '432 patent's claimed invention. (*Id.*).

While Ricoh disputes that each hardware cell description must have defined descriptions at the functional level, logic level, circuit level, and layout level, Ricoh, at the same time, admits that the hardware cells are defined to "have specific physical and functional characteristics used as building blocks for implementing an ASIC to be manufactured." In order for the hardware cells to be defined by "specific physical and functional characteristics" of "previously designed hardware cells" as Ricoh admits is necessary, the "data describing" must have corresponding descriptions at the functional level, logic level, circuit level, and layout level that are all defined. Thus, Ricoh's own

proposal for the definition of hardware cells supports Synopsys' and Defendants' proposed construction.

E. The Claim Limitations Directed To Selecting Hardware Cells Using A Rule-Based Expert System

The following two claim limitations are directed to the step of selecting hardware cells using a rule-based expert system for the claimed processes of claims 13-17 for the '432 patent:

1. storing in an expert system knowledge base a set of rules for selecting hardware cells to perform the actions and conditions;
2. selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell for performing the desired function of the application specific integrated circuit, said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base.

These two claim limitations should be construed consistently and as provided in portions H, I, J, N, and O in Synopsys' column of the Joint Claim Construction Chart. Specifically, these two claim limitations limit the claimed method of claims 13-17 by requiring that:

1. a rule-based expert system software maps each specified definition in the flowchart to a stored hardware cell description;
2. unlike conventional software, the rule-based expert system software uses an inference engine to selectively apply the rules stored in the knowledge base; and,
3. unlike conventional software, the rule-based expert system software uses a set of IF-THEN rules to map the specified definitions to the stored hardware cell descriptions.

Ricoh proposes constructions for the above two limitations without these three requirements. Ricoh does this in an attempt to alter the indisputable public record for the '432 patent and recapture claim scope that was relinquished to obtain allowance of claims 13-17. As demonstrated below, these three requirements are not only dictated by the public record for the '432 patent (*i.e.*, the claims, specification, and file history) but are also consistent with the ordinary meaning of the technical terms of art "expert system," "knowledge base," and "rules" as evidenced by contemporaneous technical dictionaries, texts, treatises, etc. from around the time the application for the '432 patent was filed.

1. Rule-Based Expert System Maps Each Specified Definition In The Flowchart To A Stored Hardware Cell Description

The language in claim 13 dictates that mapping the specified definitions to the stored hardware cell descriptions must be performed by a rule-based expert system and not conventional software. (Ex. 1 at 16: 42-44; 16:56-60) ("storing in an expert system knowledge base a set of rules for selecting hardware cells" and "said step of selecting a hardware cell comprising applying…a set of cell selection rules stored in said expert system knowledge base"). A person of ordinary skill in the art would understand this language as requiring the selecting step to be performed by a rule-based expert system. (Kowalski Decl. ¶ 56-57). To construe these limitations otherwise would constitute an improper redrafting of the claims that eliminates explicit requirements in the language used.

Besides being dictated by the claim language itself, the '432 patent's specification also mandates that a rule-based expert system be used to select the hardware cells. (Ex. 1 at Abstract; 2:58-63; 8:29-37; 8:58-60). For example, on the first page of the '432 patent, the Abstract states that the present invention's "method uses artificial intelligence and expert system technology…to select the…hardware cells." (*Id*. at Abstract). Even more compelling are the statements in the '432 patent's description that the "mapping needs the use of artificial intelligence techniques because the cell selection process is complicated" and that the "Cell Selector uses a rule based expert system to select the appropriate cell or cells to perform each action." (*Id*. at 8:58-60). Simply stated, the claim language and the '432 patent's specification both require that mapping the specified definitions to the stored hardware cell descriptions be performed by a rule-based expert system.

Such a requirement is not only evident from the claims and the specification, but any reasonable competitor reviewing the '432 patent's file history and the prior art distinguished in that file history would conclude that these two limitations require that a rule-based expert system software be used for mapping the specified definitions to the stored hardware cell descriptions. Specifically, this conclusion is inescapable for any person of skill in the art in view of the statements made regarding these limitations, the unambiguous arguments made when these limitation were added to

claim 13 (original application claim numbers 20, 21, and 25)[12], the examiner interview summary, and the prior art that was distinguished based on these limitations in the '432 patent's file history.

First, in the April 1989 Amendment in the '432 patent's file history, it was argued that using a rule-based expert system to select hardware cells distinguished the '432 patent's invention from the prior art. (Ex. 4, April 1989 Amendment at 10). In that same amendment, it was also argued that Darringer et al. did not teach the claimed method of application claim 21 because it "provides a knowledge base in the form of a **rule based** automatic logic synthesis component, *i.e.* an **expert system**." (*Id*. at 9) (emphasis added). This amendment demonstrates that mapping the specified definitions to the stored hardware cell descriptions must be performed by a rule-based expert system and not conventional algorithmic software that was known and disclosed in the prior art, including in Darringer et al.

Second, the summary of the October 1989 examiner interview and the November 1989 Amendment reveal that the limitations: 1) "storing in an expert system knowledge base a set of rules for selecting hardware cells to perform the actions and conditions;" and, 2) "said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base" were added to claim 13 (application claim 20) to claim the feature of an expert system for translating a flowchart to a netlist. That summary provides:

> It is **agreed** that the **features** "flowchart editor" and "**expert system for translating the flowchart into a netlist defining the necessary hardware cells of the integrated circuit**" are patentable [*sic*] distinct from the reference identified above. Thus, applicant's attorney **will** amend the claims to include **those features**.

(Ex. 4, Examiner Interview Summary) (emphasis added). In the November 1989 Amendment following this interview, claim 13 (application claim 20) was amended to add the step of "generating

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[12] Claim 13 of the issued '432 patent corresponds to application claim 20. Application claim 20 was amended during the file history to add the requirement of using a rule-based expert system by adding the limitation of application claim 21 to the selecting step. At the same time, the additional generating step of application claim 25 of the original patent application was also added to application claim 20.

for the selected integrated circuit hardware cells, a netlist…" from application claim 25 and the requirement from application claim 21 that the prior selecting step be performed by "applying…a set of cell selection rules stored in said expert system knowledge base." The limitation "storing in an expert system knowledge base a set of rules for selecting hardware cells …" was also added to claim 13 to provide the proper antecedent basis for the added phrase "cell selection rules stored in said expert system knowledge base." Thus, claim 13 was amended to distinguish over the Darringer et al. prior art reference by requiring the mapping of the specified definitions in the flowchart to the stored hardware cell descriptions to be performed by a rule-based expert system.

Ricoh claims that the term "expert system knowledge base" "is intended to capture the features of a 'knowledge base' that may be used in an expert system, but not intended to capture an "expert system" that uses a 'knowledge base.'" Ricoh's claim directly contradicts the '432 patent's public record. First, the April 1989 Amendment demonstrates that the addition of the language "applying . . . a set of cell selection rules stored in said expert system knowledge base" to application claim 20 (issued claim 13) from application claim 21 requires the use of a rule-based expert system for the mapping of the specified definitions to the stored hardware cell descriptions. (Ex. 4, April 1989 Amendment at 9-10). Second, when the limitation from application claim 21 was added to application claim 20 (issued claim 13), in the November 1989 Amendment, applicant explicitly stated that "Independent Claim 20 has also been amended to emphasize the expert system aspects of applicants' method." (*Id.*, November 1989 Amendment at 9). Last, the '432 patent and its file history, consistent with the extrinsic evidence, demonstrate that the terms "expert system knowledge base," "knowledge based expert system," "rule-based expert system," and "knowledge base" are all used synonymously to refer to an expert system having an inference engine and a knowledge base containing the rules embodying the expert knowledge as distinguished from conventional software programs. (Ex. 1 at 2:53-64; 5:25-29; 8:58-60; Ex. 4, April 1989 Amendment at 9; Kowalski Decl. ¶ 35; Ex. 14 at 140).

Equally misguided is Ricoh's attempt to broaden the requirement that "mapping the specified definitions to the stored hardware cell descriptions must be performed by a rule-based expert system" to its proposal, which is "selecting…a hardware cell for performing the desired function of the

desired ASIC through the application of the rules." Ricoh's proposal is contrary to the '432 patent's public record.

As demonstrated above, the language "applying . . . a set of cell selection rules stored in said expert system knowledge base" requires that the mapping be done by a rule-based expert system as defined more fully below. Ricoh's use of the phrase "through the application of the rules" attempts to eliminate the requirement from the file history that a rule-based expert system be used. Second, the language "selecting …for each of the specified definitions a corresponding integrated circuit hardware cell" requires "mapping each of the specified definitions to a stored hardware cell description." This is evident from the claim language and the '432 patent's description. (Ex. 1 at 6:28-31; 6:53-54; 8:58-60; 9:21-23; 9:51-61). Ricoh's attempt to eliminate the requirement that "each specified definition" be mapped to "a corresponding hardware cell" is contrary to the '432 patent's public record. For these reasons, Ricoh's attempt to broaden this "selecting step" contrary to the '432 patent's claims, specification, and its file history should be rejected.

2. Unlike Conventional Software, Rule-Based Expert System Software Uses An Inference Engine To Selectively Apply The Rules Stored In The Knowledge Base

This requirement deals with the critical and important distinction in the claims, the '432 patent specification and its file history between two different approaches for selecting hardware cells: 1) rule-based expert system software; and, 2) conventional algorithmic software. Specifically, the rule-based expert system software claimed in the patent for performing the mapping step must comprise an inference engine, a knowledge base, and a working memory, which enable the inference engine to selectively apply the rules stored in the knowledge base to what is stored in the working memory (as distinguished from conventional algorithmic software, which uses a predefined step-by-step procedure). A person of ordinary skill in the art in 1988 would have known that the rule-based expert system software approach is substantially different than using conventional algorithmic software. Indeed, this distinction is evident from the technical dictionaries, texts, and treatises existing at the time the application for the '432 patent was filed and confirmed by the inventor's own contemporaneous article.

An expert system is software that attempts to embody the knowledge of a human expert in a particular field and then use that knowledge to simulate the reasoning of such an expert to solve problems in that field. (Ex. 15 at 9-10, Ex. 14 at 86-87, Ex. 16 at 136). This particular type of software operates nothing like conventional software, which uses a predefined step-by-step procedure (or algorithm) for solving problems. (Ex. 6 at 1:30-54, Ex. 15 at 7-10; Ex. 14 at 6). Instead, expert systems use non-procedural processing to solve problems—*i.e.*, they solve problems through the application of the rules in the knowledge base. (Ex. 15 at 7-10).

An expert system is comprised of (i) a knowledge base containing the rules, written in IF-THEN format, which embody the expert knowledge in the particular field and (ii) an inference engine for selectively applying those rules. (Ex. 15 at 9-10, 74-75, and 99-110, Ex. 17 at 10-15, Ex. 14 at 86-87, 140, and 223, Ex. 18 at 8, Ex. 19 at 11-12, and Ex. 20 at 13-20). The rules have an antecedent portion (IF) and a consequent portion (THEN). (Ex. 15 at 74-75, Ex. 17 at 10-11, Ex. 18 at 8, Ex. 21 at 269, Ex. 20 at 14-15; Ex. 14 at 10, 53). The inference engine uses search and pattern matching techniques to selectively apply the rules in the knowledge base. (Ex. 15 at 10, Ex. 17 at 9-11). The application of these rules solves the particular problem in the field—not any predefined step-by-step procedure (*i.e.*, algorithm) as in conventional software.

Ignoring how persons of ordinary skill in the field of the invention understand expert systems technology, Ricoh proposes constructions for these two limitations that seek to alter the public record for the '432 patent by attempting to blur this critical distinction between rule-based expert system software and conventional algorithmic software so that it can later argue that claims 13-17 encompass the conventional algorithmic software that it unambiguously disclaimed to obtain these claims of the '432 patent.

First, as explained above, the language in claim 13 dictates that the mapping must be performed by a rule-based expert system and not conventional software. (Ex. 1 at 16: 42-44; 16:56-61). A person of skill in the art would understand this language to require that the selecting step uses one approach, *i.e.*, an expert system inference engine to apply a set of IF-THEN rules stored in the expert system knowledge base to the specified definitions stored in the working memory of the expert system as opposed to using the other approach, *i.e.*, conventional algorithmic software, which uses a

predefined step-by-step procedure. (Kowalski Decl. ¶ 56-57).

The distinctions between these two different approaches is also consistent with the inventor's (Dr. Kobayashi's) own 1989 article about the same KBSC system described in the '432 patent. (Ex. 2 at 351). That article confirms that to one skilled iin the art at the time of the filing, there were only two approaches and that the KBSC system was directed to using an inference engine to apply the IF-THEN rules contained in the knowledge base of a rule-based expert system and not the conventional algorithmic approach of the prior art. (*Id.* at 379-380 and 389).

The importance of the distinctions between the rule-based expert system approach and the conventional algorithmic software approach is also evident from the '432 patent's specification. For example, the specification provides that "mapping needs the use of artificial intelligence techniques because the cell selection process is complicated." (Ex. 1 at 8:34-37). This conveys to a person of ordinary skill in the art that the invention is directed to the use of rule-based expert system software and not conventional algorithmic software. (Kowalski Decl. ¶ 41, 44, 56-57). In fact, nothing in the '432 patent's specification even suggests to a person of skill in the art to use conventional algorithmic software instead of rule-based expert system software to select hardware cells.

Not only is the distinction between expert system and conventional software evident from the claims and the specification, but any reasonable competitor reviewing the '432 patent's file history and the prior art distinguished in that file history would conclude that the expert system software and conventional software are two distinct and substantially different approaches. (Ex. 4, January 1988 rejection, April 1989 amendment, August 1989 rejection, November 1989 amendment). Specifically, this is evident from the prior art that the applicant distinguished during the '432 patent's file history. (Ex. 4, April 1989 amendment at 9-10, 13, Interview Summary, and November 1989 amendment at 7-8); Ex. 6 at 1:30-56).

The '432 patent's file history also defines the "expert system knowledge base" as a knowledge base containing the rules and an inference engine for applying those rules. (Ex. 4, November 1989 Amendment at 2, 8). Given that the language "applying…a set of cell selection rules stored in said expert system knowledge base" was added to "emphasize the expert system aspects of applicants' method," the "expert system knowledge base" certainly requires "a knowledge base

containing rules for selecting hardware cells" and an "inference engine" for selectively applying those rules "for selecting appropriate hardware cells." (*Id*. at 2-3, 8-9). Thus, Ricoh's claim, in its brief, that nothing mandates that the "expert system knowledge base" have an "inference engine" not only ignores how persons in the field of the invention (including the '432 patent's inventor) would understand that term, but it is also contrary to the '432 patent's public record.

3. Unlike Conventional Software, The Rule-Based Expert System Software Uses A Set Of IF-THEN Rules For Mapping Specified Definitions To Stored Hardware Cell Descriptions

The '432 patent also unmistakably defines the "rules" used by the rule-based expert system of the claimed invention to be IF-THEN rules. (Ex. 1 at 11:1-15) (*see also* 11:48-12:30). This definition is consistent with the understanding of one of skill in the art as demonstrated by the relevant technical dictionaries, treatises, and the prior art. (Ex. 15 at 74-75, Ex. 17 at 10-11, Ex. 14 at 10, 53, Ex. 18 at 8, Ex. 21 at 269, Ex. 20 at 14-15).

The fact that the claimed invention of the '432 patent requires the use of "IF-THEN rules" is also demonstrated by the inventor's own contemporaneous article. (Ex. 2). That article described the same KBSC software described in the '432 patent and unequivocally asserts that IF-THEN rules were used by the KBSC software. (*Id* at 379, 381.). Thus, contrary to Ricoh's claims in its opening brief, persons of skill in the art (including the '432 patent's inventor) would understand the public record for the '432 patent to require that each rule have "an antecedent portion (IF) and a consequent portion (THEN)."

Aside from the fact that Ricoh's criticisms of Synopsys' and Defendants' proposal are unfounded, Ricoh improperly relies on a general-usage dictionary for its own definition of "rule" a technical term of art. Specifically, despite admitting that the "IF-THEN" rules are the only ones supported by the '432 patent's description, Ricoh, relying on a general-usage dictionary, proposes that these "rules" need only be "formulated as prescribed procedures." Ricoh's attempt to alter the definition of the technical term of art "rules" as understood by persons of skill in the art from the '432 patent to a definition from a general-usage dictionary is contrary to claim construction law. *See e.g.*, *Vanderlande*, 366 F.3d at 1321. Thus, the Court must define the "rules" to require both "an

antecedent portion (IF) and a consequent portion (THEN)" and Ricoh's attempt to broaden the '432 patent's disclosure to encompass "prescribed procedures" should be rejected.

The claim language "a set of rules for selecting hardware cells" and "said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base" requires that the IF-THEN rules stored in the knowledge base of the rule-based expert system embody the expert knowledge for mapping the specified definitions in the flowchart to the hardware cell descriptions. (Ex. 1 at 14:48-54). This is also demonstrated by the other claims in the '432 patent. (Ex. 1 at 14:57-59; 15:56-58; 18:6-8).

Aside from being dictated by the language in the claim 13 and the other claims, the '432 patent's specification also unmistakably requires that the IF-THEN rules stored in the knowledge base of the rule-based expert system embody the expert knowledge for mapping the specified definitions in the flowchart to the hardware cell descriptions. (Ex. 1 at 8:58-9:5). The "cell selection rules" referred to in this selecting step are the IF-THEN rules for "mapping macros to cells." (*Id.*). Thus, the "set of cell selection rules" are the set of IF-THEN rules of the rule-based expert system that embody the expert knowledge that is essential for mapping the specified definitions in the flowchart to the hardware cell descriptions.

Ricoh attempts to eliminate this claim requirement by proposing that the "rules" only "comprise the expert knowledge of highly skilled VLSI designers." The claim language and the '432 patent's description, however, requires that the rules not only embody the expert knowledge of highly skilled VLSI designers but that the "expert knowledge" be <u>for mapping the specified definitions in the flowchart to the hardware cell descriptions</u>. (Ex. 1 at 8:21-23; 8:34-37).

Last, Ricoh's definition for "rules" - "the expert knowledge of highly skilled VLSI designers formulated as prescribed procedures" - must be rejected because it would encompass the Darringer prior art patent, which was distinguished in the file history. (Ex. 4 at April 1989 Amendment at 9-10). Specifically, the Darringer prior art patent contains "the expert knowledge of highly skilled VLSI designers formulated as prescribed procedures" in the form of the procedures and transformations. (Ex. 5 at 7:32-9:35; Kowalski Decl. at ¶ 40). Thus, contrary to Ricoh's proposal,

"the set of rules" cannot be properly defined to encompass the procedures and transformations in the prior art because Ricoh disclaimed such a construction by arguing that Darringer had no knowledge base of any kind. *See e.g., Southwall,* 54 F.3d at 1576.

F. The Proper Construction of "Generating For The Selected Integrated Circuit Hardware Cells, A Netlist…"[13]

The claim language "generating **for the selected integrated hardware cells**, a netlist" is unambiguous. That language demonstrates that "generating . . . a netlist" step is a separate step that must come after the step of "selecting" hardware cells. This is also evident from the '432 patent's specification, which provides that the "netlist is generated **after** the cells have been selected . . . " (Ex. 1 at 9:64-65) (emphasis added).

Finally, the '432 patent's file history reveals that the generating step (application claim 25) is a separate step that follows the selecting step that was added to claim 13 (application claim 20) in an amendment where the applicant could not create "new issues." (Ex. 4, November 1989 Amendment at 6). That amendment incorporated the limitation from application claim 21 into claim 13 (application claim 20) and added the further generating step of application claim 25. (*Id.* at 4-5) The original claims 21 and 25 demonstrate that claim 21 limited the selecting step by adding a further limitation and claim 25 added the further generating step after that selecting step. (Ex. 4, Original Application at 35-36). For these reasons, Ricoh's attempt to broaden the claimed invention by incorporating this step into the previous selecting step based solely on the additional "; and" before the selecting step should be rejected.

1. This Generating Step Requires Eliminating Unnecessary Hardware Cells That Have Been Selected

The claim language "generating **for the selected…hardware cells**, a netlist defining the **hardware cells which are needed** to perform the desired function of the integrated circuit" requires

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[13] Like Ricoh's attempt to add the phrase "During manufacture…" to the construction of "computer-aided design for designing," Ricoh's attempt to add the phrase "the netlist is passed to the next subsequent step in the process for manufacturing the desired ASIC" is both contrary to and not supported by the '432 patent's public record as understood by one of skill in the art.

that this step eliminate any selected hardware cells that are not needed. In other words, this generating step "defines the needed hardware cells" by eliminating those hardware cells that have been selected but that are not necessary for the operation of the desired ASIC.

This requirement is also readily apparent from the '432 patent's specification. Specifically, the '432 patent's specification demonstrates that this generating step entails eliminating redundant and unnecessary selected hardware cells. (Ex. 1 at 13:59-66). This is illustrated in FIGS 13, 14, and 15 for the '432 patent. (Ex. 1 at 13:59-66). Given that there may be selected hardware cells that are redundant and/or unnecessary and the netlist defines only needed hardware cells, generating a netlist requires eliminating those unnecessary hardware cells.

Ricoh's opening brief appears to incorrectly claim that this elimination of redundant and unnecessary hardware cells is performed by the selecting step, which in pertinent part provides: "**selecting**…**for each of the specified definitions a corresponding** integrated circuit **hardware cell** for performing the desired function of the application specific integrated circuit, **said step of selecting a hardware cell** comprising **applying to the specified definition of the action or condition to be performed**, a set of **cell selection rules** stored in said expert system knowledge base." Ricoh's argument that these example rules for eliminating redundant and unnecessary hardware cells are encompassed by this selecting step is contrary to the explicit language. Specifically, the "cell selection rules" are "applied" to "each of the specified definitions" and this is done "for selecting a hardware cell" "corresponding" to each of the "specified of the action or condition to be performed." As demonstrated above, this "selecting step" should be interpreted as set forth in N and O of Defendants and Synopsys portion of the Joint Claim Construction Statement.

2. **The Interconnection Requirements To Be Generated For The Netlist Are The Control And Data Paths**

The '432 patent's specification defines the "interconnection requirements" for the necessary hardware cells defined in the netlist as the data and control paths. (Ex. 1 at Abstract; 5:30-35):

> From the flowchart, the system and method uses artificial intelligence and expert system technology to generate a system controller, to select the necessary integrated circuit hardware cells needed to achieve the functional specifications, and to generate **the data and control paths** for the operation of the of the integrated circuit. This list of hardware cells and their **interconnection requirements** is set forth in a netlist.

These portions of the specification reveal that the control and data paths are the "interconnection requirements" that must be generated for the netlist. (*Id*; *See also*, Ex. 1 at FIG. 6; 6:47-54; 13:55-58). Ricoh's claim that the "interconnection requirements" are not the control and data paths but are instead the "necessary parameters for connecting the respective inputs and outputs of each hardware cell" ignores the '432 patent's description and therefore, should be rejected.

3. **A System Controller Must Be Generated For The Netlist**

The claim language "a netlist defining the **hardware cells which are needed"** for the ASIC to be designed and the '432 patent specification unmistakably defines a netlist to include all of the necessary hardware cells and a controller type hardware cell is one of those necessary hardware cells. (Ex. 1 at 4:39-43; 13:67-14:3). Moreover, the Field and Background of the Invention section of the specification also demonstrates that for the netlists in the field of the invention that in addition to defining the hardware components for the ASICs desired function and their interconnection requirements a "system controller must also be designed for synchronizing the operations of these components." (*Id.* at 1:26-28).

Besides the fact that both the claim language and the specification reveal that a netlist requires a controller for controlling the other necessary hardware cells, the requirement that a controller be generated is also supported by the '432 patent's file history. Specifically, the file history limits the input specification by excluding register-transfer level descriptions that would define the control for the hardware cells of the ASIC. (Ex. 4, April 1989 Amendment at 9, November 1989 amendment at 7). Because no control is defined by the claimed invention's input, a controller must be generated to provide any necessary control for the ASIC. (Kowalski at ¶ 61-62). Thus, contrary to Ricoh's arguments, the '432 patent's public record requires that a netlist include a controller type hardware cell and that such a controller must be generated by this generating step in claim 13. This requirement in the '432 patent cannot be overcome by Ricoh's argument that generation of a controller is recited in a dependent claim. *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1582 (Fed. Cir. 1997) (concluding that where patent description provides clear meaning it trumps doctrine of claim differentiation).

G. **"Generating…Mask Data Required To Produce An Integrated Circuit…"**

The '432 patent defines "mask data" as "the detailed layout level geometrical information." (Ex. 1 at FIG. 1c; Abstract; 1:38-42; 2:44-49).[14] The illustration of mask data in Figure 1c of the '432 patent is also consistent with this definition. (Ex. 1 at FIG. 1c). Thus, the '432 patent demonstrates that "mask data" is the layout level design information generated from the netlist.

The '432 patent provides that "mask data" is "required to produce the particular application specific integrated circuit in chip form." (Ex. 1 at 2:48-49). This is consistent with the understanding of persons of skill in the art that "mask data" is used to manufacture the photomasks (or masks) that are themselves used in the other processes that manufacture the desired ASIC. (Kowalski Decl. ¶¶ 8-9, 65-66). In other words, because the processes that manufacture the desired ASIC require the photomasks, the mask data that is used to manufacture the photomasks is required for producing the ASIC. (*Id.*).

But while layout design information such as mask data is required for producing ASICs, it is certainly not used to directly manufacture ASICs as Ricoh claims. (*Id*. at ¶ 7-10). Ricoh seeks to add the phrase "which can be directly used by a chip foundry in the fabrication of the ASIC." This phrase, however, is contrary to how one of skill in the art would understand "mask data" and also finds no support in the '432 patent or its file history. Thus, the court should adopt Synopsys' and Defendants' proposed construction for claim 14.

H. **The Proper Construction Of Dependent Claims 15-17**

First, for claims 15 and 17, Ricoh again proposes a definition that seeks to obfuscate the distinction between "manufacturing" and "designing." Specifically, Ricoh's proposed interpretation for these two claims includes the phrase "producing signal lines for carrying." (Kowalski Decl. at ¶

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[14] Although dependent claim 14 adds the step of generating mask data from the netlist produced by independent claim 13, from the '432 patent's description it is plain that the KBSC software is not capable of performing that step. (Ex. 1 at 2:57-62). Instead, the '432 patent simply states that there are commercially available computer-aided design systems for producing mask data from the netlist data. (Ex. 1 at 2:44-49, 4:44-46, 5:40-44). Thus, the '432 patent fails to describe any embodiment for creating mask data and this failure renders claim 14 invalid pursuant to 35 U.S.C. § 112.

68 and 72). This phrase finds no support in the '432 patent or its file history. (Ex. 1, Ex. 4). It is also contrary to how one of ordinary skill in the art would interpret claims 15 and 17 because a person of skill in the art would interpret the control and data paths as the interconnection requirements for the hardware cells at the structural level. (Kowalski Decl. at ¶¶ 63-64, 67-68, 71-72; Ex. 1 at Abstract, Figs. 6 & 13-15, 1:17-37; 2:39-44; 3:23-25; 3:40-45; 4:39-43; 5:8-12; 5:30-40; 13:55-14:3). Ricoh claims that the control and data paths are "signal lines" as opposed to "structural descriptions" as proposed by Synopsys and Defendants. Ricoh is wrong. Ricoh supports this claim by relying on only a portion of the description in the '432 patent relating to FIG. 1b. (Ex. 1 at 3:59-65). But the *entire* portion of this section of the '432 patent, however, reveals that it actually supports Synopsys' and Defendants' position that these control and data paths are "structural descriptions" not "signal lines." (*Id.; see also Id.* 3:4-5).

Second, claim 16 requires using a rule-based expert system software including an inference engine for selectively applying the set of IF-THEN rules stored in the knowledge base for generating the data paths for the selected hardware cells. (Kowalski Decl. at ¶ 69-70). Similar to the selecting step of claim 13, Ricoh proposes an interpretation for this claim to eliminate the arguments for the substantial differences between rule-based expert system software and the conventional software programs. This is contrary to the '432 patent and its file history as well as how one of ordinary skill in the art would interpret this claim. (Ex. 1 at Abstract, 5:8-12; 13:55-14:3; Ex. 4, November 1989 Amendment at 7 and 9, Kowalski Decl. at ¶ 69-70).

VI. CONCLUSION

For all of the foregoing reasons and the intrinsic and extrinsic evidence identified in Synopsys' and Defendants' portion of the Joint Claim Construction Statement filed on July 16, 2004, the Court should adopt Synopsys' and Defendants' claim constructions for the '432 patent as set forth in their proposed order filed with this brief.

Dated: September 14, 2004

Respectfully submitted,

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

RICOH COMPANY, LTD., Plaintiff, vs. AEROFLEX INCORPORATED, et al., Defendants.	Case No. C03-04669 MJJ (EMC) Case No. C03-2289 MJJ (EMC) **[PROPOSED] ORDER RE CLAIM CONSTRUCTION OF CLAIMS 13-17 OF UNITED STATES PATENT NO. 4,922,432**
SYNOPSYS, INC., Plaintiff, vs. RICOH COMPANY, LTD., a Japanese corporation Defendant.	Date: October 29, 2004 Time: 9:30 AM Courtroom: 11 Judge: Martin J. Jenkins

The parties have asked the Court to construe the disputed terms, phrases, and clauses in claims 13-17 of United States Patent No. 4,922,432 (the '432 patent"). On October 29, 2004, the Court held a hearing in accordance with *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996), to construe the disputed terms, phrases, and clauses of the asserted claims. After consideration of the papers filed in support of each of the parties' claim construction, and having heard oral argument of counsel at the hearing, the Court construes the claims as follows:

Claim Language	**[Proposed] Definitions For Disputed Claim Terms, Phrases, And Clauses**	**[Proposed] Construction Of Limitation Incorporating Definitions**
13. A computer-aided design process for designing an application specific integrated circuit which will perform a desired function comprising	A. "A computer-aided design process for designing" -- a process that uses a computer for designing, as distinguished from a computer-aided manufacturing process, which uses a computer to direct and control the manufacturing process. B. "application specific integrated circuit" -- an interconnected miniaturized electronic circuit on a single piece of semiconductor material designed to perform a specific function, as distinguished from standard, general purpose integrated circuits, such as microprocessors, memory chips, etc.	A process that uses a computer for designing (as distinguished from a computer-aided manufacturing process, which uses a computer to direct and control the manufacturing process) an interconnected miniaturized electronic circuit on a single piece of semiconductor material designed to perform a specific function as distinguished from standard, general purpose integrated circuits, such as microprocessors, memory chips, etc.
storing a set of definitions of architecture independent actions and conditions;	C. "actions and conditions"-- are the logical steps and decisions that are represented as rectangles and diamonds in the flowchart; collectively logical operations. D. "architecture independent" -- not including (i.e., excluding) a register transfer level (RTL) description or any other description that is hardware architecture dependent. An RTL description consists of: 1) defining the inputs, outputs, and any registers of the proposed ASIC; and, 2) describing for a single clock cycle of the ASIC how the ASIC outputs and any registers are set	storing a set of named descriptions defining the functionality and arguments for the available logical steps and decisions that may be specified in the flowchart where register-transfer level (RTL) descriptions are excluded. An RTL description defines any control needed for the ASIC and consists of: 1) defining the inputs, outputs, and any registers of the proposed ASIC; and, 2) describing for a single clock cycle of the ASIC how the ASIC outputs and any registers are set according to the values of the ASIC inputs and the

Claim Language	[Proposed] Definitions For Disputed Claim Terms, Phrases, And Clauses	[Proposed] Construction Of Limitation Incorporating Definitions
	according to the values of the ASIC inputs and the previous values of the registers; an RTL description defines any control needed for the ASIC. E. "a set of definitions of architecture independent actions and conditions" -- a set of named descriptions defining the functionality and arguments for the available logical steps and decisions that may be specified in the flowchart; and excluding a register transfer level description.	previous values of the registers.
storing data describing a set of available integrated circuit hardware cells for performing the actions and conditions defined in the stored set;	F. "hardware cells" -- logic blocks for which the functional level (e.g., register transfer level), logic level (e.g., flip flop and gate level), circuit level (e.g., transistor level), and layout level (e.g., geometrical mask level) descriptions are all defined. G. "data describing a set of available integrated circuit hardware cells for performing the actions and conditions defined in the stored set" -- a set of named integrated circuit hardware cells that includes at least one hardware cell for each stored definition that may be specified for the available logical steps and decisions; where each named hardware cell has corresponding descriptions at the functional level (e.g., register transfer level), logic level (e.g., flip-flop and gate level), circuit level (e.g., transistor level), and layout level (e.g., geometrical mask level) that are all defined.	storing a set of named integrated circuit hardware cells that includes at least one hardware cell for each stored definition that may be specified for the available logical steps and decisions; where each named hardware cell has corresponding descriptions at the functional level (e.g., register transfer level), logic level (e.g., flip-flop and gate level), circuit level (e.g., transistor level), and layout level (e.g., geometrical mask level) that are all defined;

Claim Language	[Proposed] Definitions For Disputed Claim Terms, Phrases, And Clauses	[Proposed] Construction Of Limitation Incorporating Definitions
storing in an expert system knowledge base a set of rules for selecting hardware cells to perform the actions and conditions;	H. "expert system" -- software executing on a computer system that attempts to embody the knowledge of a human expert in a particular field and then uses that knowledge to simulate the reasoning of such an expert to solve problems in that field. This system is comprised of a knowledge base containing rules, working memory containing the problem description, and an inference engine. It solves problems through the selective application of the rules in the knowledge base to the problem description, as distinguished from conventional software, which uses a predefined step-by-step procedure (algorithm) to solve problems. I. "Knowledge base" -- the portion of the expert system containing a set of rules embodying the expert knowledge for the particular field. J. "a set of rules for selecting hardware cells to perform the actions and conditions" -- a set of rules, each having an antecedent portion (IF) and a consequent portion (THEN), embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to map the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description.	storing in the knowledge base portion of an expert system (software that solves problems through selective application of the rules in the knowledge base by an inference engine, as distinguished from conventional software, which uses a predefined step-by-step procedure (algorithm) to solve problems) a set of rules, each having an antecedent portion (IF) and a consequent portion (THEN), and embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to map the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description;

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describing for a proposed application specific integrated circuit a series of architecture independent actions and conditions;	K. "describing for a proposed application specific integrated circuit a series of architecture independent actions and conditions" -- the designer represents a sequence of logical steps (rectangles) and decisions (diamonds), and the transitions (lines with arrows) between them in a flowchart format for a proposed application specific integrated circuit.	the designer represents (for a proposed application specific integrated circuit) a sequence of logical steps (rectangles) and decisions (diamonds), and the transitions (lines with arrows) between them in a flowchart format that excludes any register-transfer level descriptions.
specifying for each described action and condition of the series one of said stored definitions which corresponds to the desired action or condition to be performed; and	L. "specifying for each described action and condition of the series one of said stored definitions" -- the designer assigns one definition from the set of stored definitions for each of the described logical steps and decisions represented in the flowchart. M. "which corresponds to the desired action or condition to be performed" -- each specified definition must correspond to the intended step or decision to be performed.	the designer assigns one definition from the set of stored definitions for each of the described logical steps and decisions represented in the flowchart; and each specified definition must correspond to the intended step or decision to be performed;

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selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell for performing the desired function of the application specific integrated circuit, said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base and	N. "selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell for performing the desired function of the application specific integrated circuit" -- mapping the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description. O. "said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed, a set of cell selection rules stored in said expert system knowledge base" -- the mapping of the specified definitions to the stored hardware cell descriptions must be performed by an expert system having an inference engine for selectively applying a set of rules, each rule having an antecedent portion (IF) and a consequent portion (THEN), embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to map the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description.	mapping the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description, where the mapping of the specified definitions to the stored hardware cell descriptions must be performed by an expert system having an inference engine for selectively applying a set of rules, each rule having an antecedent portion (IF) and a consequent portion (THEN), embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to map the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description;

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generating for the selected integrated circuit hardware cells, a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit and the interconnection requirements therefor.	P. "netlist" -- a structural description that includes a custom controller type hardware cell and all other hardware cells required to implement the application specific integrated circuit's operations and any necessary interconnections including the necessary control and data path information for connecting the hardware cells and the controller. Q. "generating for the selected integrated circuit hardware cells, a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit" -- producing a list of the needed hardware cells by eliminating any mapped hardware cells that are redundant or otherwise unnecessary and producing a custom controller type hardware cell for providing the needed control for those other hardware cells and R. "generating …interconnection requirements therefor" -- producing the necessary structural control paths and data paths for the needed hardware cells and the custom controller.	producing a list of the needed hardware cells by eliminating any mapped hardware cells that are redundant or otherwise unnecessary, producing a custom controller type hardware cell for providing the needed control for those other hardware cells, and producing the necessary structural control paths and data paths for the needed hardware cells and the custom controller
14. A process as defined in claim 13, including generating from the netlist the mask data required to produce an integrated circuit having the desired function.	S. "generating from the netlist the mask data required to produce an integrated circuit having the desired function" -- producing, from the structural netlist, the detailed layout level geometrical information required for manufacturing the set of photomasks that are used by the processes that directly manufacture the application specific integrated circuit.	A process as defined in claim 13, including producing, from the structural netlist, the detailed layout level geometrical information required for manufacturing the set of photomasks that are used by the processes that directly manufacture the application specific integrated circuit
15. A process as defined in claim 13 including the	T. "generating data paths for the selected integrated circuit hardware cells" -- producing the necessary	A process as defined in claim 13 including the further step of producing the necessary structural

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further step of generating data paths for the selected integrated circuit hardware cells.	structural descriptions of the data paths for the mapped hardware cells.	descriptions of the data paths for the mapped hardware cells.
16. A process as defined in claim 15 wherein said step of generating data paths comprises applying to the selected cells a set of data path rules stored in a knowledge base and generating the data paths therefrom.	U. "said step of generating data paths comprises applying to the selected cells a set of data path rules stored in a knowledge base and generating the data paths therefrom" -- the generating step must be performed by at least an expert system having an inference engine for selectively applying a set of rules, each having an antecedent portion (IF) and a consequent portion (THEN), embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to produce the necessary data paths for the mapped hardware cells.	A process as defined in claim 15 where the generating step must be performed by at least an expert system having an inference engine for selectively applying a set of rules, each having an antecedent portion (IF) and a consequent portion (THEN), embodying the knowledge of expert designers for application specific integrated circuits, which enables the expert system to produce the necessary data paths for the mapped hardware cells.
17. A process as defined in claim 16 including the further step of generating control paths for the selected integrated circuit hardware cells.	V. "generating control paths for the selected integrated circuit hardware cells" --producing the necessary structural descriptions of the control paths for the selected hardware cells.	A process as defined in claim 16 including the further step of producing the necessary structural descriptions of the control paths for the selected hardware cells.

Dated: _____

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The Honorable Martin J. Jenkins
United States District Court Judge